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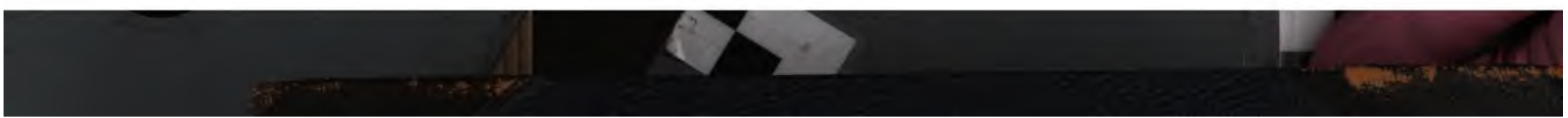

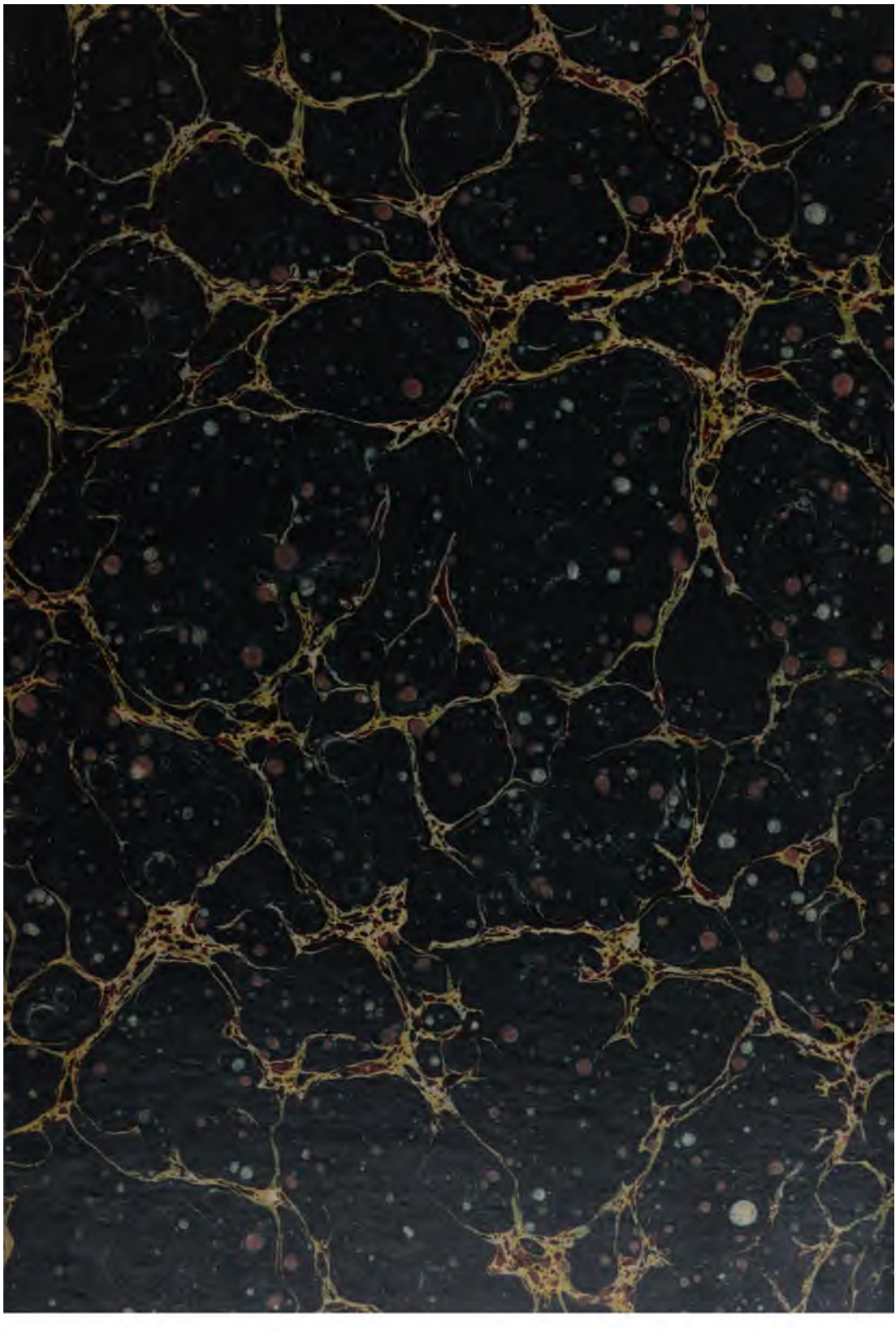

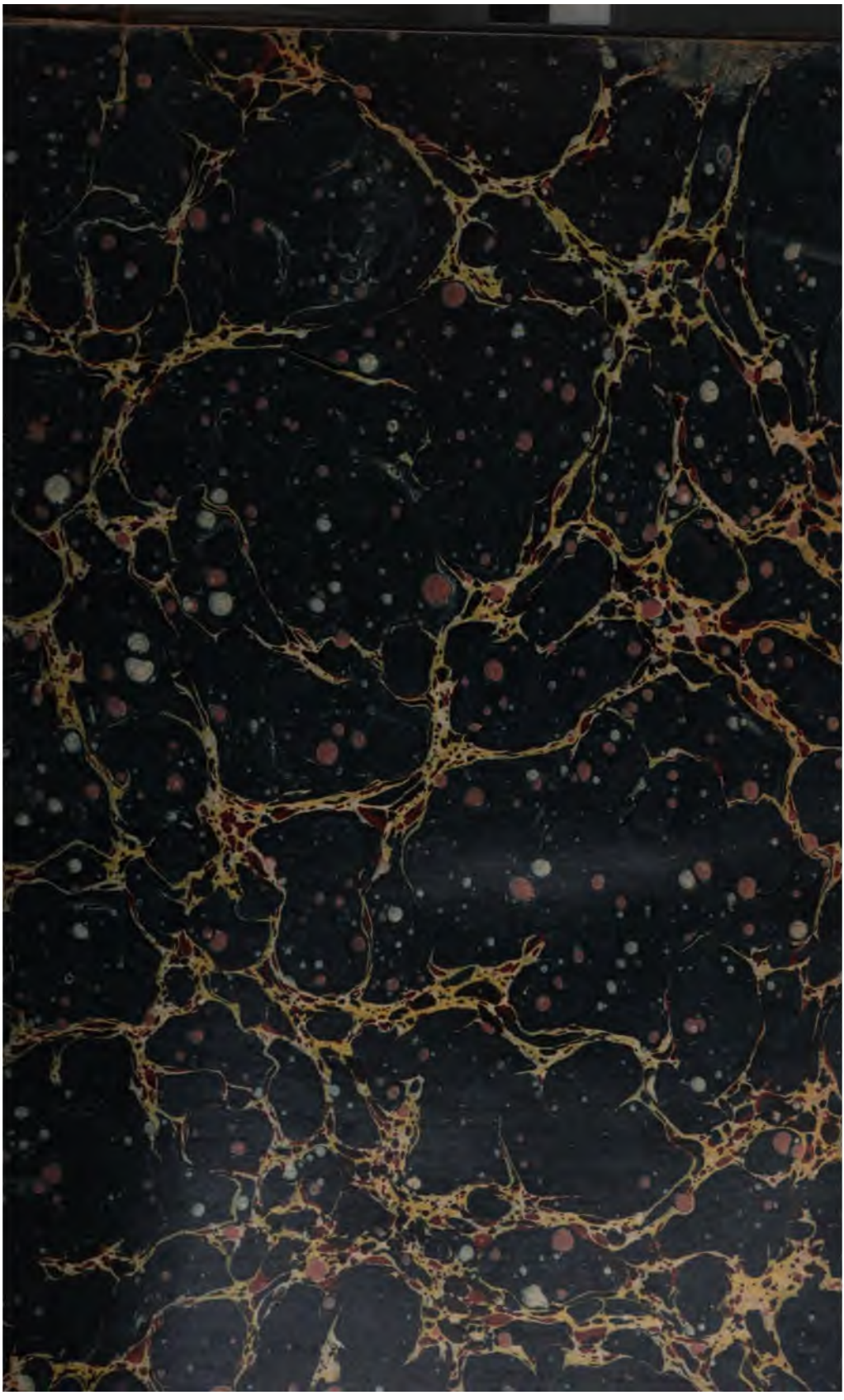

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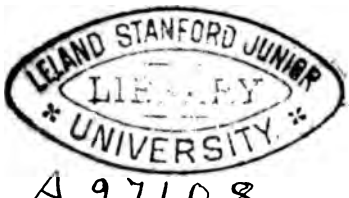

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Plates belonging to the article "The Nervous Ganglia of Insects." (In No. 1 of this volume.)

VOL. III. OCTOBER, 1892. NO. 1.

THE MONIST.

MAN'S GLASSY ESSENCE.

IN *The Monist* for January, 1891, I tried to show what conceptions ought to form the brick and mortar of a philosophical system. Chief among these was that of absolute chance for which I argued again in last April's number.* In July, I applied another fundamental idea, that of continuity, to the law of mind. Next in order, I have to elucidate, from the point of view chosen, the relation between the psychical and physical aspects of a substance.

The first step towards this ought, I think, to be the framing of a molecular theory of protoplasm. But before doing that, it seems indispensable to glance at the constitution of matter, in general. We shall, thus, unavoidably make a long detour; but, after all, our pains will not be wasted, for the problems of the papers that are to follow in the series will call for the consideration of the same question.

All physicists are rightly agreed the evidence is overwhelming which shows all sensible matter is composed of molecules in swift motion and exerting enormous mutual attractions, and perhaps repulsions, too. Even Sir William Thomson, Lord Kelvin, who wishes to explode action at a distance and return to the doctrine of a plenum, not only speaks of molecules, but undertakes to assign definite

* I am rejoiced to find, since my last paper was printed, that a philosopher as subtle and profound as Dr. Edmund Montgomery has long been arguing for the same element in the universe. Other world-renowned thinkers, as M. Renouvier and M. Delbœuf, appear to share this opinion.

magnitudes to them. The brilliant Judge Stallo, a man who did not always rightly estimate his own qualities in accepting tasks for himself, declared war upon the atomic theory in a book well worth careful perusal. To the old arguments in favor of atoms which he found in Fechner's monograph, he was able to make replies of considerable force, though they were not sufficient to destroy those arguments. But against modern proofs he made no headway at all. These set out from the mechanical theory of heat. Rumford's experiments showed that heat is not a substance. Joule demonstrated that it was a form of energy. The heating of gases under constant volume, and other facts instanced by Rankine, proved that it could not be an energy of strain. This drove physicists to the conclusion that it was a mode of motion. Then it was remembered that John Bernoulli had shown that the pressure of gases could be accounted for by assuming their molecules to be moving uniformly in rectilinear paths. The same hypothesis was now seen to account for Avogadro's law, that in equal volumes of different kinds of gases exposed to the same pressure and temperature are contained equal numbers of molecules. Shortly after, it was found to account for the laws of diffusion and viscosity of gases, and for the numerical relation between these properties. Finally, Crookes's radiometer furnished the last link in the strongest chain of evidence which supports any physical hypothesis.

Such being the constitution of gases, liquids must clearly be bodies in which the molecules wander in curvilinear paths, while in solids they move in orbits or quasi-orbits. (See my definition *solid* II, 1, in the "Century Dictionary.")

We see that the resistance to compression and to interpenetration between sensible bodies is, by one of the prime propositions of the molecular theory, due in large measure to the kinetical energy of the particles, which must be supposed to be quite remote from one another, on the average, even in solids. This resistance is no doubt influenced by finite attractions and repulsions between the molecules. All the impenetrability of bodies which we can observe is, therefore, a limited impenetrability due to kinetic and positional energy. This being the case, we have no logical right to suppose

that absolute impenetrability, or the exclusive occupancy of space, belongs to molecules or to atoms. It is an unwarranted hypothesis, not a *vera causa*.* Unless we are to give up the theory of energy, finite positional attractions and repulsions between molecules must be admitted. Absolute impenetrability would amount to an infinite repulsion at a certain distance. No analogy of known phenomena exists to excuse such a wanton violation of the principle of continuity as such a hypothesis is. In short, we are logically bound to adopt the Boscovichian idea that an atom is simply a distribution of component potential energy throughout space, (this distribution being absolutely rigid,) combined with inertia. The potential energy belongs to two molecules, and is to be conceived as different between molecules *A* and *B* from what it is between molecules *A* and *C*. The distribution of energy is not necessarily spherical. Nay, a molecule may conceivably have more than one centre ; it may even have a central curve, returning into itself. But I do not think there are any observed facts pointing to such multiple or linear centres. On the other hand, many facts relating to crystals, especially those observed by Voigt,† go to show that the distribution of energy is harmonical but not concentric. We can easily calculate the forces which such atoms must exert upon one another by considering‡ that they are equivalent to aggregations of pairs of electrically positive and negative points infinitely near to one another. About such an atom there would be regions of positive and of negative potential, and the number and distribution of such regions would determine the valency of the atom, a number which it is easy to see would in many cases be somewhat indeterminate. I must not dwell further upon this hypothesis, at present. In another paper, its consequences will be further considered.

I cannot assume that the students of philosophy who read this magazine are thoroughly versed in modern molecular physics, and

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* By a *vera causa*, in the logic of science, is meant a state of things known to exist in some cases and supposed to exist in other cases, because it would account for observed phenomena.

† Wiedemann, *Annalen*, 1887–1889.

‡ See Maxwell on Spherical Harmonics, in his *Electricity and Magnetism*.

therefore it is proper to mention that the governing principle in this branch of science is Clausius's law of the virial. I will first state the law, and then explain the peculiar terms of the statement. This statement is that the total kinetic energy of the particles of a system in stationary motion is equal to the total virial. By a *system* is here meant a number of particles acting upon one another.* Stationary motion is a quasi-orbital motion among a system of particles so that none of them are removed to indefinitely great distances nor acquire indefinitely great velocities. The kinetic energy of a particle is the work which would be required to bring it to rest, independently of any forces which may be acting upon it. The virial of a pair of particles is half the work which the force which actually operates between them would do if, being independent of the distance, it were to bring them together. The equation of the virial is

$$\tfrac{1}{2}\Sigma mv^2 = \tfrac{1}{2}\Sigma\Sigma Rr.$$

Here m is the mass of a particle, v its velocity, R is the attraction between two particles, and r is the distance between them. The sign Σ on the left hand side signifies that the values of mv^2 are to be summed for all the particles, and $\Sigma\Sigma$ on the right hand side signifies that the values of Rr are to be summed for all the pairs of particles. If there is an external pressure P (as from the atmosphere) upon the system, and the volume of vacant space within the boundary of that pressure is V, then the virial must be understood as including $\frac{3}{2}PV$, so that the equation is

$$\tfrac{1}{2}\Sigma mv^2 = \tfrac{3}{2}PV + \tfrac{1}{2}\Sigma\Sigma Rr.$$

There is strong (if not demonstrative) reason for thinking that the temperature of any body above the absolute zero (—273° C.), is proportional to the average kinetic energy of its molecules, or say $a\theta$,

---

* The word *system* has three peculiar meanings in mathematics. (*A.*) It means an orderly exposition of the truths of astronomy, and hence a theory of the motions of the stars; as the Ptolemaic *system*, the Copernican *system*. This is much like the sense in which we speak of the Calvinistic *system* of theology, the Kantian *system* of philosophy, etc. (*B.*) It means the aggregate of the planets considered as all moving in somewhat the same way, as the solar *system;* and hence any aggregate of particles moving under mutual forces. (*C.*) It means a number of forces acting simultaneously upon a number of particles.

where a is a constant and θ is the absolute temperature. Hence, we may write the equation

$$a\theta = \tfrac{1}{2}\overline{mv^2} = \tfrac{2}{3}P\overline{V} + \tfrac{1}{2}\Sigma\overline{Rr}$$

where the heavy lines above the different expressions signify that the average values for single molecules are to be taken. In 1872, a student in the University of Leyden, Van der Waals, propounded in his thesis for the doctorate a specialisation of the equation of the virial which has since attracted great attention. Namely, he writes it

$$a\theta = (P + \frac{c}{V^2})(V - b).$$

The quantity b is the volume of a molecule, which he supposes to be an impenetrable body, and all the virtue of the equation lies in this term which makes the equation a cubic in V, which is required to account for the shape of certain isothermal curves.* But if the idea of an impenetrable atom is illogical, that of an impenetrable molecule is almost absurd. For the kinetical theory of matter teaches us that a molecule is like a solar system or star-cluster in miniature. Unless we suppose that in all heating of gases and vapors internal work is performed upon the molecules, implying that their atoms are at considerable distances, the whole kinetical theory of gases falls to the ground. As for the term added to P, there is no more than a partial and roughly approximative justification for it. Namely, let us imagine two spheres described round a particle as their centre, the radius of the larger being so great as to include all the particles whose action upon the centre is sensible, while the radius of the smaller is so large that a good many molecules are included within it. The possibility of describing such a sphere as the outer one implies that the attraction of the particles varies at some distances inversely as some higher power of the distance than the cube, or, to speak more clearly, that the attraction multiplied by the cube of the distance diminishes as the distance increases; for the number of particles at a given distance from any

* But, in fact, an inspection of these curves is sufficient to show that they are of a higher degree than the third. For they have the line $V = 0$, or some line V a constant for an asymptote, while for small values of P, the values of $d^2P/(dV)^2$ are positive.

one particle is proportionate to the square of that distance and each of these gives a term of the virial which is the product of the attraction into the distance. Consequently unless the attraction multiplied by the cube of the distance diminished so rapidly with the distance as soon to become insensible, no such outer sphere as is supposed could be described. However, ordinary experience shows that such a sphere is possible; and consequently there must be distances at which the attraction does thus rapidly diminish as the distance increases. The two spheres, then, being so drawn, consider the virial of the central particle due to the particles between them. Let the density of the substance be increased, say, N times. Then, for every term, Rr, of the virial before the condensation, there will be N terms of the same magnitude after the condensation. Hence, the virial of each particle will be proportional to the density, and the equation of the virial becomes

$$a\theta = P\overline{V} + \frac{c}{\overline{V}}.$$

This omits the virial within the inner sphere, the radius of which is so taken that within that distance the number of particles is not proportional to the number in a large sphere. For Van der Waals this radius is the diameter of his hard molecules, which assumption gives his equation. But it is plain that the attraction between the molecules must to a certain extent modify their distribution, unless some pecular conditions are fulfilled. The equation of Van der Waals can be approximately true therefore only for a gas. In a solid or liquid condition, in which the removal of a small amount of pressure has little effect on the volume, and where consequently the virial must be much greater than $P\overline{V}$, the virial must increase with the volume. For suppose we had a substance in a critical condition in which an increase of the volume would diminish the virial more than it would increase $\frac{3}{2}P\overline{V}$. If we were forcibly to diminish the volume of such a substance, when the temperature became equalised, the pressure which it could withstand would be less than before, and it would be still further condensed, and this would go on indefinitely until a condition were reached in which an increase of volume would increase $\frac{3}{2}P\overline{V}$ more than it would decrease the virial.

In the case of solids, at least, P may be zero; so that the state reached would be one in which the virial increases with the volume, or the attraction between the particles does not increase so fast with a diminution of their distance as it would if the attraction were inversely as the distance.

Almost contemporaneously with Van der Waals's paper, another remarkable thesis for the doctorate was presented at Paris by Amagat. It related to the elasticity and expansion of gases, and to this subject the superb experimenter, its author, has devoted his whole subsequent life. Especially interesting are his observations of the volumes of ethylene and of carbonic acid at temperatures from 20° to 100° and at pressures ranging from an ounce to 5000 pounds to the square inch. As soon as Amagat had obtained these results, he remarked that the "coefficient of expansion at constant volume," as it is absurdly called, that is, the rate of variation of the pressure with the temperature, was very nearly constant for each volume. This accords with the equation of the virial, which gives

$$\frac{dp}{d\theta} = \frac{a}{\overline{V}} - \frac{d\Sigma\overline{Rr}}{d\theta}.$$

Now, the virial must be nearly independent of the temperature, and therefore the last term almost disappears. The virial would not be quite independent of the temperature, because if the temperature (i. e. the square of the velocity of the molecules) is lowered, and the pressure correspondingly lowered, so as to make the volume the same, the attractions of the molecules will have more time to produce their effects, and consequently, the pairs of molecules the closest together will be held together longer and closer; so that the virial will generally be increased by a decrease of temperature. Now, Amagat's experiments do show an excessively minute effect of this sort, at least, when the volumes are not too small. However, the observations are well enough satisfied by assuming the "coefficient of expansion at constant volume" to consist wholly of the first term, $a/\overline{V}$. Thus, Amagat's experiments enable us to determine the values of a and thence to calculate the virial; and this we find varies for carbonic acid gas nearly inversely to $\overline{V}^{0.9}$. There is, thus, a rough approximation to satisfying Van der Waals's equation. But the

most interesting result of Amagat's experiments, for our purpose at any rate, is that the quantity a, though nearly constant for any one volume, differs considerably with the volume, nearly doubling when the volume is reduced fivefold. This can only indicate that the mean kinetic energy of a given mass of the gas for a given temperature is greater the more the gas is compressed. But the laws of mechanics appear to enjoin that the mean kinetic energy of a moving particle shall be constant at any given temperature. The only escape from contradiction, then, is to suppose that the mean mass of a moving particle diminishes upon the condensation of the gas. In other words, many of the molecules are dissociated, or broken up into atoms or sub-molecules. The idea that dissociation should be favored by diminishing the volume will be pronounced by physicists, at first blush, as contrary to all our experience. But it must be remembered that the circumstances we are speaking of, that of a gas under fifty or more atmospheres pressure, are also unusual. That the "coefficient of expansion under constant volume" when multiplied by the volumes should increase with a decrement of the volume is also quite contrary to ordinary experience; yet it undoubtedly takes place in all gases under great pressure. Again, the doctrine of Arrhenius* is now generally accepted, that the molecular conductivity of an electrolyte is proportional to the dissociation of ions. Now the molecular conductivity of a fused electrolyte is usually superior to that of a solution. Here is a case, then, in which diminution of volume is accompanied by increased dissociation.

The truth is that several different kinds of dissociation have to be distinguished. In the first place, there is the dissociation of a chemical molecule to form chemical molecules under the regular action of chemical laws. This may be a double decomposition, as when iodhydric acid is dissociated, according to the formula

$$HI + HI = HH + II;$$

or, it may be a simple decomposition, as when pentachloride of phosphorus is dissociated according to the formula

$$PCl_5 = PCl_3 + ClCl.$$

*Anticipated by Clausius as long ago as 1857; and by Williamson in 1851.

All these dissociations require, according to the laws of thermo-chemistry, an elevated temperature. In the second place, there is the dissociation of a physically polymerous molecule, that is, of several chemical molecules joined by physical attractions. This I am inclined to suppose is a common concomitant of the heating of solids and liquids; for in these bodies there is no increase of compressibility with the temperature at all comparable with the increase of the expansibility. But, in the third place, there is the dissociation with which we are now concerned, which must be supposed to be a throwing off of unsaturated sub-molecules or atoms from the molecule. The molecule may, as I have said, be roughly likened to a solar system. As such, molecules are able to produce perturbations of one another's internal motions; and in this way a planet, i. e. a sub-molecule, will occasionally get thrown off and wander about by itself, till it finds another unsaturated sub-molecule with which it can unite. Such dissociation by perturbation will naturally be favored by the proximity of the molecules to one another.

Let us now pass to the consideration of that special substance, or rather class of substances, whose properties form the chief subject of botany and of zoölogy, as truly as those of the silicates form the chief subject of mineralogy: I mean the life-slimes, or protoplasm. Let us begin by cataloguing the general characters of these slimes. They one and all exist in two states of aggregation, a solid or nearly solid state and a liquid or nearly liquid state; but they do not pass from the former to the latter by ordinary fusion. They are readily decomposed by heat, especially in the liquid state; nor will they bear any considerable degree of cold. All their vital actions take place at temperatures very little below the point of decomposition. This extreme instability is one of numerous facts which demonstrate the chemical complexity of protoplasm. Every chemist will agree that they are far more complicated than the albumens. Now, albumen is estimated to contain in each molecule about a thousand atoms; so that it is natural to suppose that the protoplasms contain several thousands. We know that while they are chiefly composed of oxygen, hydrogen, carbon, and nitrogen, a large number of other elements enter into living bodies in small proportions; and

it is likely that most of these enter into the composition of protoplasms. Now, since the numbers of chemical varieties increase at an enormous rate with the number of atoms per molecule, so that there are certainly hundreds of thousands of substances whose molecules contain twenty atoms or fewer, we may well suppose that the number of protoplasmic substances runs into the billions or trillions. Professor Cayley has given a mathematical theory of "trees," with a view of throwing a light upon such questions; and in that light the estimate of trillions (in the English sense) seems immoderately moderate. It is true that an opinion has been emitted, and defended among biologists, that there is but one kind of protoplasm; but the observations of biologists, themselves, have almost exploded that hypothesis, which from a chemical standpoint appears utterly incredible. The anticipation of the chemist would decidedly be that enough different chemical substances having protoplasmic characters might be formed to account, not only for the differences between nerve-slime and muscle-slime, between whale-slime and lion-slime, but also for those minuter pervasive variations which characterise different breeds and single individuals.

Protoplasm, when quiescent, is, broadly speaking, solid; but when it is disturbed in an appropriate way, or sometimes even spontaneously without external disturbance, it becomes, broadly speaking, liquid. A moner in this state is seen under the microscope to have streams within its matter; a slime-mould slowly flows by force of gravity. The liquefaction starts from the point of disturbance and spreads through the mass. This spreading, however, is not uniform in all directions; on the contrary it takes at one time one course, at another another, through the homogeneous mass, in a manner that seems a little mysterious. The cause of disturbance being removed, these motions gradually (with higher kinds of protoplasm, quickly) cease, and the slime returns to its solid condition.

The liquefaction of protoplasm is accompanied by a mechanical phenomenon. Namely, some kinds exhibit a tendency to draw themselves up into a globular form. This happens particularly with the contents of muscle-cells. The prevalent opinion, founded on some

of the most exquisite experimental investigations that the history of science can show, is undoubtedly that the contraction of muscle-cells is due to osmotic pressure; and it must be allowed that that is a factor in producing the effect. But it does not seem to me that it satisfactorily accounts even for the phenomena of muscular contraction; and besides, even naked slimes often draw up in the same way. In this case, we seem to recognise an increase of the surface-tension. In some cases, too, the reverse action takes place, extraordinary pseudopodia being put forth, as if the surface-tension were diminished in spots. Indeed, such a slime always has a sort of skin, due no doubt to surface-tension, and this seems to give way at the point where a pseudopodium is put forth.

Long-continued or frequently repeated liquefaction of the protoplasm results in an obstinate retention of the solid state, which we call fatigue. On the other hand repose in this state, if not too much prolonged, restores the liquefiability. These are both important functions.

The life-slimes have, further, the peculiar property of growing. Crystals also grow; their growth, however, consists merely in attracting matter like their own from the circumambient fluid. To suppose the growth of protoplasm of the same nature, would be to suppose this substance to be spontaneously generated in copious supplies wherever food is in solution. Certainly, it must be granted that protoplasm is but a chemical substance, and that there is no reason why it should not be formed synthetically like any other chemical substance. Indeed, Clifford has clearly shown that we have overwhelming evidence that it is so formed. But to say that such formation is as regular and frequent as the assimilation of food is quite another matter. It is more consonant with the facts of observation to suppose that assimilated protoplasm is formed at the instant of assimilation, under the influence of the protoplasm already present. For each slime in its growth preserves its distinctive characters with wonderful truth, nerve-slime growing nerve-slime and muscle-slime muscle-slime, lion-slime growing lion-slime, and all the varieties of breeds and even individual characters being preserved in the growth. Now it is too much to suppose there are billions

of different kinds of protoplasm floating about wherever there is food.

The frequent liquefaction of protoplasm increases its power of assimilating food; so much so, indeed, that it is questionable whether in the solid form it possesses this power.

The life-slime wastes as well as grows; and this too takes place chiefly if not exclusively in its liquid phases.

Closely connected with growth is reproduction; and though in higher forms this is a specialised function, it is universally true that wherever there is protoplasm, there is, will be, or has been a power of reproducing that same kind of protoplasm in a separated organism. Reproduction seems to involve the union of two sexes; though it is not demonstrable that this is always requisite.

Another physical property of protoplasm is that of taking habits. The course which the spread of liquefaction has taken in the past is rendered thereby more likely to be taken in the future; although there is no absolute certainty that the same path will be followed again.

Very extraordinary, certainly, are all these properties of protoplasm; as extraordinary as indubitable. But the one which has next to be mentioned, while equally undeniable, is infinitely more wonderful. It is that protoplasm feels. We have no direct evidence that this is true of protoplasm universally, and certainly some kinds feel far more than others. But there is a fair analogical inference that all protoplasm feels. It not only feels but exercises all the functions of mind.

Such are the properties of protoplasm. The problem is to find a hypothesis of the molecular constitution of this compound which will account for these properties, one and all.

Some of them are obvious results of the excessively complicated constitution of the protoplasm molecule. All very complicated substances are unstable; and plainly a molecule of several thousand atoms may be separated in many ways into two parts in each of which the polar chemical forces are very nearly saturated. In the solid protoplasm, as in other solids, the molecules must be supposed to be moving as it were in orbits, or, at least, so as not to wander

indefinitely. But this solid cannot be melted, for the same reason that starch cannot be melted ; because an amount of heat insufficient to make the entire molecules wander is sufficient to break them up completely and cause them to form new and simpler molecules. But when one of the molecules is disturbed, even if it be not quite thrown out of its orbit at first, sub-molecules of perhaps several hundred atoms each are thrown off from it. These will soon acquire the same mean kinetic energy as the others, and therefore velocities several times as great. They will naturally begin to wander, and in wandering will perturb a great many other molecules and cause them in their turn to behave like the one originally deranged. So many molecules will thus be broken up, that even those that are intact will no longer be restrained within orbits, but will wander about freely. This is the usual condition of a liquid, as modern chemists understand it ; for in all electrolytic liquids there is considerable dissociation.

But this process necessarily chills the substance, not merely on account of the heat of chemical combination, but still more because the number of separate particles being greatly increased, the mean kinetic energy must be less. The substance being a bad conductor, this heat is not at once restored. Now the particles moving more slowly, the attractions between them have time to take effect, and they approach the condition of equilibrium. But their dynamic equilibrium is found in the restoration of the solid condition, which therefore takes place, if the disturbance is not kept up.

When a body is in the solid condition, most of its molecules must be moving at the same rate, or, at least, at certain regular sets of rates ; otherwise the orbital motion would not be preserved. The distances of neighboring molecules must always be kept between a certain maximum and a certain minimum value. But if, without absorption of heat, the body be thrown into a liquid condition, the distances of neighboring molecules will be far more unequally distributed, and an effect upon the virial will result. The chilling of protoplasm upon its liquefaction must also be taken into account. The ordinary effect will no doubt be to increase the cohesion and with that the surface-tension, so that the mass will tend to draw it-

self up. But in special cases, the virial will be increased so much that the surface-tension will be diminished at points where the temperature is first restored. In that case, the outer film will give way and the tension at other places will aid in causing the general fluid to be poured out at those points, forming pseudopodia.

When the protoplasm is in a liquid state, and then only, a solution of food is able to penetrate its mass by diffusion. The protoplasm is then considerably dissociated ; and so is the food, like all dissolved matter. If then the separated and unsaturated sub-molecules of the food happen to be of the same chemical species as sub-molecules of the protoplasm, they may unite with other sub-molecules of the protoplasm to form new molecules, in such a fashion that when the solid state is resumed, there may be more molecules of protoplasm than there were at the beginning. It is like the jack-knife whose blade and handle, after having been severally lost and replaced, were found and put together to make a new knife.

We have seen that protoplasm is chilled by liquefaction, and that this brings it back to the solid state, when the heat is recovered. This series of operations must be very rapid in the case of nerve-slime and even of muscle-slime, and may account for the unsteady or vibratory character of their action. Of course, if assimilation takes place, the heat of combination, which is probably trifling, is gained. On the other hand, if work is done, whether by nerve or by muscle, loss of energy must take place. In the case of the muscle, the mode by which the instantaneous part of the fatigue is brought about is easily traced out. If when the muscle contracts it be under stress, it will contract less than it otherwise would do, and there will be a loss of heat. It is like an engine which should work by dissolving salt in water and using the contraction during the solution to lift a weight, the salt being recovered afterwards by distillation. But the major part of fatigue has nothing to do with the correlation of forces. A man must labor hard to do in a quarter of an hour the work which draws from him enough heat to cool his body by a single degree. Meantime, he will be getting heated, he will be pouring out extra products of combustion, perspiration, etc., and he will be driving the blood at an accelerated rate through mi-

nute tubes at great expense. Yet all this will have little to do with his fatigue. He may sit quietly at his table writing, doing practically no physical work at all, and yet in a few hours be terribly fagged. This seems to be owing to the deranged sub-molecules of the nerve-slime not having had time to settle back into their proper combinations. When such sub-molecules are thrown out, as they must be from time to time, there is so much waste of material.

In order that a sub-molecule of food may be thoroughly and firmly assimilated into a broken molecule of protoplasm, it is necessary not only that it should have precisely the right chemical composition, but also that it should be at precisely the right spot at the right time and should be moving in precisely the right direction with precisely the right velocity. If all these conditions are not fulfilled, it will be more loosely retained than the other parts of the molecule; and every time it comes round into the situation in which it was drawn in, relatively to the other parts of that molecule and to such others as were near enough to be factors in the action, it will be in special danger of being thrown out again. Thus, when a partial liquefaction of the protoplasm takes place many times to about the same extent, it will, each time, be pretty nearly the same molecules that were last drawn in that are now thrown out. They will be thrown out, too, in about the same way, as to position, direction of motion, and velocity, in which they were drawn in; and this will be in about the same course that the ones last before them were thrown out. Not exactly, however; for the very cause of their being thrown off so easily is their not having fulfilled precisely the conditions of stable retention. Thus, the law of habit is accounted for, and with it its peculiar characteristic of not acting with exactitude.

It seems to me that this explanation of habit, aside from the question of its truth or falsity, has a certain value as an addition to our little store of mechanical examples of actions analogous to habit. All the others, so far as I know, are either statical or else involve forces which, taking only the sensible motions into account, violate the law of energy. It is so with the stream that wears its own bed. Here, the sand is carried to its most stable situation and left there. The law of energy forbids this; for when anything reaches a position

of stable equilibrium, its momentum will be at a maximum, so that it can according to this law only be left at rest in an unstable situation. In all the statical illustrations, too, things are brought into certain states and left there. A garment receives folds and keeps them; that is, its limit of elasticity is exceeded. This failure to spring back is again an apparent violation of the law of energy; for the substance will not only not spring back of itself (which might be due to an unstable equilibrium being reached) but will not even do so when an impulse that way is applied to it. Accordingly, Professor James says "the phenomena of habit . . . are due to the plasticity of the . . . materials." Now, plasticity of materials means the having of a low limit of elasticity. (See the "Century Dictionary," under *solid.*) But the hypothetical constitution of protoplasm here proposed involves no forces but attractions and repulsions strictly following the law of energy. The action here, that is, the throwing of an atom out of its orbit in a molecule, and the entering of a new atom into nearly, but not quite the same orbit, is somewhat similar to the molecular actions which may be supposed to take place in a solid strained beyond its limit of elasticity. Namely, in that case certain molecules must be thrown out of their orbits, to settle down again shortly after into new orbits. In short, the plastic solid resembles protoplasm in being partially and temporarily liquefied by a slight mechanical force. But the taking of a set by a solid body has but a moderate resemblance to the taking of a habit, inasmuch as the characteristic feature of the latter, its inexactitude and want of complete determinacy, is not so marked in the former, if it can be said to be present there, at all.

The truth is that though the molecular explanation of habit is pretty vague on the mathematical side, there can be no doubt that systems of atoms having polar forces would act substantially in that manner, and the explanation is even too satisfactory to suit the convenience of an advocate of tychism. For it may fairly be urged that since the phenomena of habit may thus result from a purely mechanical arrangement, it is unnecessary to suppose that habit-taking is a primordial principle of the universe. But one fact remains unexplained mechanically, which concerns not only the facts

of habit, but all cases of actions apparently violating the law of energy; it is that all these phenomena depend upon aggregations of trillions of molecules in one and the same condition and neighborhood; and it is by no means clear how they could have all been brought and left in the same place and state by any conservative forces. But let the mechanical explanation be as perfect as it may, the state of things which it supposes presents evidence of a primordial habit-taking tendency. For it shows us like things acting in like ways because they are alike. Now, those who insist on the doctrine of necessity will for the most part insist that the physical world is entirely individual. Yet law involves an element of generality. Now to say that generality is primordial, but generalisation not, is like saying that diversity is primordial but diversification not. It turns logic upside down. At any rate, it is clear that nothing but a principle of habit, itself due to the growth by habit of an infinitesimal chance tendency toward habit-taking, is the only bridge that can span the chasm between the chance-medley of chaos and the cosmos of order and law.

I shall not attempt a molecular explanation of the phenomena of reproduction, because that would require a subsidiary hypothesis, and carry me away from my main object. Such phenomena, universally diffused though they be, appear to depend upon special conditions; and we do not find that all protoplasm has reproductive powers.

But what is to be said of the property of feeling? If consciousness belongs to all protoplasm, by what mechanical constitution is this to be accounted for? The slime is nothing but a chemical compound. There is no inherent impossibility in its being formed synthetically in the laboratory, out of its chemical elements; and if it were so made, it would present all the characters of natural protoplasm. No doubt, then, it would feel. To hesitate to admit this would be puerile and ultra-puerile. By what element of the molecular arrangement, then, would that feeling be caused? This question cannot be evaded or pooh-poohed. Protoplasm certainly does feel; and unless we are to accept a weak dualism, the property must be shown to arise from some peculiarity of the mechanical sys-

tem. Yet the attempt to deduce it from the three laws of mechanics, applied to never so ingenious a mechanical contrivance, would obviously be futile. It can never be explained, unless we admit that physical events are but degraded or undeveloped forms of psychical events. But once grant that the phenomena of matter are but the result of the sensibly complete sway of habits upon mind, and it only remains to explain why in the protoplasm these habits are to some slight extent broken up, so that according to the law of mind, in that special clause of it sometimes called the principle of accommodation,* feeling becomes intensified. Now the manner in which habits generally get broken up is this. Reactions usually terminate in the removal of a stimulus; for the excitation continues as long as the stimulus is present. Accordingly, habits are general ways of behavior which are associated with the removal of stimuli. But when the expected removal of the stimulus fails to occur, the excitation continues and increases, and non-habitual reactions take place; and these tend to weaken the habit. If, then, we suppose that matter never does obey its ideal laws with absolute precision, but that there are almost insensible fortuitous departures from regularity, these will produce, in general, equally minute effects. But protoplasm is in an excessively unstable condition; and it is the characteristic of unstable equilibrium, that near that point excessively minute causes may produce startlingly large effects. Here then, the usual departures from regularity will be followed by others that are very great; and the large fortuitous departures from law so produced, will tend still further to break up the laws, supposing that these are of the nature of habits. Now, this breaking up of habit and renewed fortuitous spontaneity will, according to the law of mind, be accompanied by an intensification of feeling. The nerve-protoplasm is, without doubt, in the most unstable condition of any kind of matter; and consequently, there the resulting feeling is the most manifest.

Thus we see that the idealist has no need to dread a mechan-

* "Physiologically, . . . accommodation means the breaking up of a habit. . . . Psychologically, it means reviving consciousness." Baldwin, *Psychology*, Part III ch. i., § 5.

ical theory of life. On the contrary, such a theory, fully developed, is bound to call in a tychistic idealism as its indispensable adjunct. Wherever chance-spontaneity is found, there, in the same proportion, feeling exists. In fact, chance is but the outward aspect of that which within itself is feeling. I long ago showed that real existence, or thing-ness, consists in regularities. So, that primeval chaos in which there was no regularity was mere nothing, from a physical aspect. Yet it was not a blank zero; for there was an intensity of consciousness there in comparison with which all that we ever feel is but as the struggling of a molecule or two to throw off a little of the force of law to an endless and innumerable diversity of chance utterly unlimited.

But after some atoms of the protoplasm have thus become partially emancipated from law, what happens next to them? To understand this, we have to remember that no mental tendency is so easily strengthened by the action of habit as is the tendency to take habits. Now, in the higher kinds of protoplasm, especially, the atoms in question have not only long belonged to one molecule or another of the particular mass of slime of which they are parts; but before that, they were constituents of food of a protoplasmic constitution. During all this time, they have been liable to lose habits and to recover them again; so that now, when the stimulus is removed, and the foregone habits tend to reassert themselves, they do so in the case of such atoms with great promptness. Indeed, the return is so prompt that there is nothing but the feeling to show conclusively that the bonds of law have ever been relaxed.

In short, diversification is the vestige of chance-spontaneity; and wherever diversity is increasing, there chance must be operative. On the other hand, wherever uniformity is increasing, habit must be operative. But wherever actions take place under an established uniformity, there so much feeling as there may be takes the mode of a sense of reaction. That is the manner in which I am led to define the relation between the fundamental elements of consciousness and their physical equivalents.

It remains to consider the physical relations of general ideas. It may be well here to reflect that if matter has no existence except

as a specialisation of mind, it follows that whatever affects matter according to regular laws is itself matter. But all mind is directly or indirectly connected with all matter, and acts in a more or less regular way; so that all mind more or less partakes of the nature of matter. Hence, it would be a mistake to conceive of the psychical and the physical aspects of matter as two aspects absolutely distinct. Viewing a thing from the outside, considering its relations of action and reaction with other things, it appears as matter. Viewing it from the inside, looking at its immediate character as feeling, it appears as consciousness. These two views are combined when we remember that mechanical laws are nothing but acquired habits, like all the regularities of mind, including the tendency to take habits, itself; and that this action of habit is nothing but generalisation, and generalisation is nothing but the spreading of feelings. But the question is, how do general ideas appear in the molecular theory of protoplasm?

The consciousness of a habit involves a general idea. In each action of that habit certain atoms get thrown out of their orbit, and replaced by others. Upon all the different occasions it is different atoms that are thrown off, but they are analogous from a physical point of view, and there is an inward sense of their being analogous. Every time one of the associated feelings recurs, there is a more or less vague sense that there are others, that it has a general character, and of about what this general character is. We ought not, I think, to hold that in protoplasm habit never acts in any other than the particular way suggested above. On the contrary, if habit be a primary property of mind, it must be equally so of matter, as a kind of mind. We can hardly refuse to admit that wherever chance motions have general characters, there is a tendency for this generality to spread and to perfect itself. In that case, a general idea is a certain modification of consciousness which accompanies any regularity or general relation between chance actions.

The consciousness of a general idea has a certain "unity of the ego," in it, which is identical when it passes from one mind to another. It is, therefore, quite analogous to a person; and, indeed, a person is only a particular kind of general idea. Long ago, in the

Journal of Speculative Philosophy (Vol. III, p. 156), I pointed out that a person is nothing but a symbol involving a general idea; but my views were, then, too nominalistic to enable me to see that every general idea has the unified living feeling of a person.

All that is necessary, upon this theory, to the existence of a person is that the feelings out of which he is constructed should be in close enough connection to influence one another. Here we can draw a consequence which it may be possible to submit to experimental test. Namely, if this be the case, there should be something like personal consciousness in bodies of men who are in intimate and intensely sympathetic communion. It is true that when the generalisation of feeling has been carried so far as to include all within a person, a stopping-place, in a certain sense, has been attained; and further generalisation will have a less lively character. But we must not think it will cease. *Esprit de corps*, national sentiment, sym-pathy, are no mere metaphors. None of us can fully realise what the minds of corporations are, any more than one of my brain-cells can know what the whole brain is thinking. But the law of mind clearly points to the existence of such personalities, and there are many ordinary observations which, if they were critically examined and supplemented by special experiments, might, as first appearances promise, give evidence of the influence of such greater persons upon individuals. It is often remarked that on one day half a dozen people, strangers to one another, will take it into their heads to do one and the same strange deed, whether it be a physical experiment, a crime, or an act of virtue. When the thirty thousand young people of the society for Christian Endeavor were in New York, there seemed to me to be some mysterious diffusion of sweetness and light. If such a fact is capable of being made out anywhere, it should be in the church. The Christians have always been ready to risk their lives for the sake of having prayers in common, of getting together and praying simultaneously with great energy, and especially for their common body, for "the whole state of Christ's church militant here in earth," as one of the missals has it. This practice they have been keeping up everywhere, weekly, for many centuries. Surely, a personality ought to have developed

in that church, in that "bride of Christ," as they call it, or else there is a strange break in the action of mind, and I shall have to acknowledge my views are much mistaken. Would not the societies for psychical research be more likely to break through the clouds, in seeking evidences of such corporate personality, than in seeking evidences of telepathy, which, upon the same theory, should be a far weaker phenomenon ?

C. S. PEIRCE.

THE FUTURE OF THOUGHT IN AMERICA.

HISTORY teaches us the nature of the degenerative and destructive agencies in national life. These are of various kinds, but they may be generally included under the heads of Physical Vices, Superstitions, and Selfish Ambitions. These have become possible through excess of emotional, and deficiency of rational states of the mind. When a large part of a population is influenced by emotional rather than by rational modes of thought, unethical conduct has full opportunity, and suffering and destruction are sure to follow. All races and nations are subject to such disorders, if only in some cases during their periods of infancy and of degeneracy.

The peoples of Europe have difficulties and dangers which are due to their own peculiar situation. The people of North America have to meet certain risks of a somewhat different character, owing to our peculiar position. In Europe we see an accumulation of many races who reached their *Ultima Thule* at the coast of the Atlantic, and who have had to accommodate themselves to each other as best they could. Speaking different languages and having different political organisations, they have consolidated into separate nations. This result has only been reached after many conflicts, and the result has been the combination and absorption of smaller states into greater, such as we find them to-day. This result has not terminated conflicts; it has reduced their frequency but has increased their scope and importance. To-day the antagonisms of these nations impose great burdens upon them, but they are at the same time productive of great good.

With men as with other animals excellence is the result of use and exercise. With animals this exercise has been compulsory, and has been due largely to the pressure of hunger. Among men intellectual and ethical excellence may be due to compulsion, or it may result from the capacity to develop lofty ideals. In the former case man is driven; in the latter case he is led. Now the organisation of human society is such, that if man will not be led, he is driven. The "mills of the Gods" are ever ready for those who lag behind in the progress of the race. But there are mills and mills, and no mill has yet appeared in human history better calculated to grind out a good grist from an intellectual point of view, than western Eurasia, or Europe. The emulations and antagonisms of so many nations have stimulated men to do their best, and have stimulated governments to aid them in doing it, for several centuries. The result has been modern art, modern science pure and applied, and modern philosophy. To produce all this however, Europe has been under pressure, and the pressure has been in some, if not all of its countries, more or less galling.

The European, in order to escape local tyranny, political, social, or theological, or to better his chances of physical living, has come to America. He has taken possession, and has bettered his condition from a physical point of view, most successfully. The question that interests us now, is whether he has bettered himself in any other way, and whether he is going to continue the mental progress which has so distinguished his history in Europe. Population is rapidly increasing, and the increasing severity of the "struggle for existence" which will follow, will stimulate men to increased excellence in their methods of obtaining a livelihood, but will it develop the mind in any other direction? We have before us in the case of China, the effect of close industrial competition in a dense population, without corresponding intellectual development. What is the outlook for the American? Will the process of natural selection only, the "devil-take-the-hindmost" doctrine of Darwin, be sufficient to develop the higher mental faculties, or having developed them, to enable them to survive and to become general, or not?

In the first place we lack in America the great stimulus to mental progress already referred to, international jealousy and emulation. In this respect we are situated very much like the Chinese, but if anything less favorably. We practically own the continent. We have no fear of Tartar invasions from the west nor Japanese from the north east. The Canadians are of identical race with ourselves, and are almost certain to become identical in nationality with us. We are accustomed to boast ourselves of this, and to look with great satisfaction on our isolated position among nations. But our self-gratulation must be greatly tempered by the reflection that such isolation is only beneficial so long as we can maintain our ideals without external stimulus. And this is something that few nations have so far been able to accomplish. It is true, however, that the Atlantic ocean is not so wide as it was formerly, and we are truly one of the family of the Indo-European nations. But we will miss the effect of the daily stimulus which they afford each other, and the daily contact which transmits so much from man to man.

What is our present intellectual rank among these nations today; meaning by this our status in actual production of intellectual work, and leaving aside history? Without any great competence to speak on many branches of such work, I may be not far from correct if I summarise as follows: In music and sculpture unproductive; in painting and literature (as an art) good, but weak in quantity in comparison with our population. In sciences, feeble in many branches, but very productive in some others. I refer to pure science. In applied science we stand high. In philosophy as a nation, weak.

But we have the future before us. If there is a demand for the products of pure thought in this country, the supply will come. Much may be expected of our race. We will hope that the demand will grow, for at present it is not as large as it ought to be. It is of course easy for thought to "run in accustomed channels," and many people there are in this as in all other countries, who believe that sufficient is already known, and that he who would disturb current opinions is a "disturber of the peace." Strange as it may seem, in this comparatively new country we have one special in-

ducement to this habit of mind. This is to be found in our political system, which requires an unhesitating submission to the will of the majority.

Here is our second danger. We are apt to confuse mental submission with physical submission. Physical submission to the will of the majority is generally necessary for physical reasons, with which we are all familiar. Ballots are simply a peaceful representation of bullets, and we anticipate the submission to the latter by submission to the former. But the mind should be free. Current or popular opinions are not always correct. In fact if they were, reform or progress would be unnecessary. A proposal for change always begins with a minority, and much time may often elapse before such change becomes acceptable to the majority. Before the majority accepts a new step of progress the progressive idea cannot govern physically. It must be content to be unpopular for a greater or less time. Now the politician naturally dreads unpopularity, for it is political death. And just in proportion as we are politicians do we share in this unfortunate mental attitude. And how many Americans are not politicians? It is the prevalent ethical disease of Americans. If it becomes general, the progress of this country is ended, and her fate among nations is sealed. Her manhood is gone, and woman may well feel her hand itch to

> "Defeat their dirty tricks
> Confound their politics."

The prevalence of the habit of submission to what we know to be wrong in this country is simply detestable. Herbert Spencer has given us some excellent advice on this subject, and we will do well to heed it. The habit extends all the way through political, scientific, and domestic economy. The unpopularity of the reformer is expressed in the term "kicker," which is applied to him among the lower classes in this country. As one of its advocates once said to me, it is the "American System," and there was a strong element of truth in his assertion. With such people, criticism is identical with quarrelling, for they cannot conceive of any motive for endeavoring to reform some abuse or correct some error, but personal

rancor. Such an attitude is a sure mark of intellectual mediocrity and ethical incapacity, and it infinitely increases the pains of the reformer, and readily converts him into a martyr. However, there are a good many men left in this country, and there are agencies at work which will probably keep up the supply.

In the absence of compulsion in the form of external or civil wars and other disasters, the churches are doing a good work in keeping ideals before the people, and in inviting corresponding practical life. It is true that their efforts are more or less retarded by the insistence on erroneous and even absurd opinions about some things, but they do infinite service in teaching that "man shall not live by bread alone," nor by the mere display of physical possessions. They teach that there are ideals of truth and beauty better worth living for, and that the mind is the greater part of man. It is the churches which make the majority of scientists and philosophers, as they formerly did of painters. Then let the churches flourish. Like the nations of Europe, their emulations and antagonisms bring out the truth. The Presbyterians have to solve the knotty questions of biblical inspiration and divine order. The Methodists will have to study the nature and value of human emotions. The Friends will know what is to be known of immediate divine influence. The Catholics have learned how to restrain in some measure the most thoughtless of mankind. The Unitarians and Ethical Culturists are proving that man may retain and live up to high ideals without much or any theology. So long as there is no philosophy or none to speak of in America, the evolution of thought will come from the conflicts of the theologies; a peaceful war which is far less wasteful than physical wars. Theology has been generally in Europe the parent of philosophy, and so it will be here. From the various stages and conditions of the agitation will spring science and art. By this method man is led into progress by measures which involve the best attributes of his nature, instead of being driven by appeals to his lower motives, or by physical force. In this progress moral courage is not lost, but it is developed; and criticism is truth's best weapon, and is not a cause of offense. That this progress in the churches is real, is proven by our Woodrow,

McQueary, Briggs, and others, and it will go on as long as the love of truth and moral courage exist in those organisations.

It is interesting to remember that this struggle of opinions has passed through the same stages in Europe wherever the love of truth has had an abiding place. This is especially true of Germany, where also philosophy has had so large a development in relatively modern times. But we need something more than opinions to counteract the dangers which threaten earnestness of character in this country, which I have pointed out. Active organisations are necessary, which shall resist tendencies to crystallisation from both sides. Non-theological people must be stimulated to maintain ethical ideals; and theological people must be restrained from smothering them under useless and obstructive dogmas and practices. It is too true that while some theological dogmas include high ethical ideals, other dogmas discredit them by deriving them from incredible sources, and seeking to sustain them by incredible sanctions. Where such dogmas are sincerely held, true thought is suppressed, knowledge makes slow progress, and ethical life is more difficult.

As already remarked, we cannot yet claim to be, as a nation, distinguished for profound thinking on the subjects of highest human interest; nor yet are we the most thoughtless. Ignorance of the possibilities of mind is not so general as in some parts of Europe, but it is greater than in others. Material objects and interests occupy almost as exclusively the minds of the majority of our citizens whom we are accustomed to consider "intelligent," as among the unintelligent. Hence our proneness to boast of our material greatness, instead of our intellectual conquests. Hence that weakest of all forms of self-praise, the publication of the dimensions of our country and its rapid growth, as though these were indications of our superiority as a people or as a race. This is repeated *ad nauseam*, while our real merits, our contributions to the stock of the world's progress in thought, knowledge, and mental power, are passed by in silence. Our newspaper press reflects this state of affairs, since they generally think it their best policy to follow rather than lead public opinion. There are, however, noteworthy exceptions to this character of the press both in the east and the west,

which we owe to the superiority of the men who edit and direct them.

In the conduct of our schools and of our scientific organisations, we have a corresponding exhibition of mediocrity or worse, with a few noble and distinguished exceptions. A mere interest in education and research does not confer competency to direct and sustain them; yet an interest in such matters is generally the only qualification demanded of the directors of such institutions, provided they understand how to buy, sell, and invest money. It is to be hoped that this state of affairs will some day pass away, and that men who are influential in such matters will some time know enough themselves to distinguish between the false and the true, and between men of ability and adventurers who are after the money and position with which our institutions of learning and our scientific enterprises can endow them. This reform will progress exactly in proportion as it is understood how much human happiness depends on true research and on correct thinking, and how little on revelation and on ancient dogma.

It is not, I repeat, sufficiently understood, how much human conduct depends on correct thinking. How much financial dishonesty would be averted by a rational thought as to the inevitable consequences? How much social irregularity would be prevented by a similar treatment of the subject? How much hatred and wasteful antagonism would the world lack, if the ordinary conditions of living were understood and acted on! So the cultivation of the rational mind is of incalculable importance, and if we wish to prosper as a nation we must bend our energies to the pleasant task this problem presents to us. Neglect of our mental powers means degeneracy and decay; while their cultivation means power and happiness. Wealth, except as a means of attaining this end, after physical necessities are supplied, is simply useless.

E. D. Cope.

MENTAL MUMMIES.

IF we should name the most important factor in the changes which have gradually widened the contrast between modern science and the scholasticism of the Middle Ages, we might define it as a "progressive recognition of hereditary influences."

There was a time when each individual of the human race was considered a separate accident, called into existence by an act of unlimited, arbitrary power, and apt to be as suddenly changed, even unto a complete inversion of his former moral being, by a merciful, or revengeful, caprice of the same power.

Biology has since taught us to apply the doctrine of evolution to the problems of our own moral and physical nature, to trace the tendencies of bygone times to their effects in the present age, to consider individuals the outcome of a long series of precedent influences, and to recognise the truth that the length of those influences is proportioned to the persistence of the result.

Intelligent statesmen were the first to appreciate the practical value of those facts. The advisers of Alexander II. did not waste their time in a hopeless attempt to convert the freedom-worshipping natives of the Caucasus into devotees of Muscovite despotism, but at once confronted them with the alternative of exile or death. Our Indian commissioners early realised the impossibility of turning the descendants of a long ancestry of deer-hunters into tillers of the soil, and transferred the survivors of the long race-war to a territory where they could for better or worse, indulge their incurable penchant. The Groot Fontein penitentiary of the Transvaal Republic became the grave of so many Caffirs that the managers at last abandoned the plan of inuring nomads to the restraints of sedentary occupation,

and saved the lives, if not the souls of their convicts by sending them about in chain-gangs to mend the irrigation ditches of the border settlements.

Hereditary influences cannot be obliterated by force of rhetoric or of government edicts and it would solve many riddles if we would apply that principle to phenomena of ethical and religious evolution. How else shall we explain the fact that in less than sixty years the doctrine of Protestantism spread from central Germany to the highland hamlets of Scotland and Scandinavia, while in Spain, Portugal, and Italy a very decided progress in general intelligence has failed to lead to a similar result? How shall we account for the success of Christian missionaries in Tasmania and Otaheiti and their utter failure in Burmah and Hindostan? How for the persecution-proof vitality of Judaism, the ready collapse of Mormonism, or the revival of crass mystic delusions in the midst of our realistic civilisation?

There is no doubt that the average Spanish sailor, or village-shopkeeper of to-day possesses a larger stock of general information than the average Brunswick school-teacher of the sixteenth century. Yet one of the least learned of those school-teachers could, by instinct, sufficiently appreciate the significance of the Protestant revolt to celebrate its triumph by a big bonfire and what our western friends would call a "grand war-dance," on a height near the little town of Wolfenbüttel. Why does Pedro Gonzales still cross himself at the mention of a heretic, while Peter Jansen would as soon return to the pig-sty hovels of the mediæval serfs as crawl back under the yoke of Jesuitry? How could the bogs of foggy Ireland and the vegas of sunny Spain nourish equally imperishable roots of a plant that failed to get a firm foothold in the sands of Brandenburgh?

The solution of those enigmas can be found in the circumstance that the doctrine of anti-naturalism had extended its influence to the character of many European nations, and that the character-traits of a race are less amenable to rapid changes than its intellectual standards. On the soul-organism of the Latin races the thousand years influence of monastic tyranny has left traces which the light of science will fail to efface for centuries to come. The propaganda

of a manlier creed has thus been defeated, not only by their ignorance, but by their aversion to mental efforts, by their habitual reliance on miracles, by their incurable indifference to the claims of truth and the merits of intellectual independence, by their hereditary mistrust in the competence of their natural instinct. To their moral palate a doctrine which nauseates their northern neighbors has become a pleasant narcotic; they have been forced to swallow the opium of pessimism till a craving for the repetition of the mind-enervating dose has become a second nature; they hug the cross that has proved a symbol of death to their noblest reformers.

Against that influence of perverted instincts the logic of mental revelations avails but little. "Propositions which would appear self-evident to certain mental constitutions," says Dr. Carpenter, "are apt to be very differently received by others, according to their conformity or discordance with that *aggregate of preformed opinion* which has grown up in the minds of each. For just as we try whether a new piece of furniture which is offered us does or does not fit into a certain recess in our apartment, and accept or decline it accordingly, so we try a new proposition which is offered to our mental acceptance. If it either at once fits in or can by argument or discussion be brought to fit in to some recess in our fabrics of thought, we give our assent to it by admitting it to its appropriate place. But if it neither fits in the first instance nor can by any means be brought to fit, the mind automatically rejects it."

It is true that logical demonstrations may become complete enough to defy dissent, but even from facts which force themselves upon the acceptance of every rational human being, different individuals will draw widely different inferences. That the mind of man may become a receptacle for irreconcilable doctrines is strikingly illustrated by the simultaneous acceptance of the Old and New Testament of our heterogeneous scripture, and in the same way obstinate bigots manage to associate scientific truth and dogmatic absurdities. Darwin and Moses may occupy adjoining quarters in the fabric of the same cosmogony; the rule of three may become a passive concomitant of Trinitarian dogmas. The torch of truth may be permitted to flicker in a secluded recess of souls which refuse it the

privilege of throwing its rays in certain directions. Education may fail to reclaim hereditary bigotry. In the winter of 1559 the rabble of Madrid assembled to witness the death of Don Carlos de Seso, a Spanish nobleman whose ancestors had fought at Granada and Toledo. His brother had been the favorite hunting-companion of Charles V. ; one of his uncles had sacrificed his life in deciding the victory of Pavia ; Don Carlos himself had acquired renown both as a soldier and a scholar, but in the latter capacity he had confessed his sympathy with certain doctrines of Martin Luther, and the Holy Inquisition had sentenced him to anticipate his doom in the flames of the stake. King Philip II. honored the *auto da fé* with his presence, and frowned in a way which the condemned freethinker mistook for a disapproval of his sentence. "O King! can you thus witness the torture of your subjects?" exclaimed De Seso. "Deliver us from so cruel a death which even our enemies admit we have not deserved." "I would help carrying faggots to burn my own son," replied the King, "if he had incurred your unspeakable guilt." Yet Philip the Second was one of the best-educated princes of his century. In mathematics, astronomy, ancient and modern languages, geography, and history, he was far better informed than Landgraf Philip of Hessen, who would have risked his own life to save that of a loyal cavalier.

There are mental mummies who cannot be revived by removing their grave-shrouds and clothing them in modern drapery ; the principle of conservatism has penetrated their very veins and the marrow of their bones. It is by no means unconceivable that a popular leader like Garibaldi or Porfirio Diaz should succeed in persuading a million of his countrymen to renounce the yoke of Rome and build Protestant chapels, but the result would be largely limited to a change of nomenclature. Before long the dissenters would march in procession with a wonder-working tooth of John Wesley or kiss a shred from the petticoat of the Holy Maid of Kent. They would groan at the mention of Rome, but exorcise spooks with the initials of Ulric Zwingli, and abstain from work on the anniversary of every Protestant martyr. They would try to redeem drunkards by sprinkling them with consecrated water from the holy rivers of Kansas,

and celebrate Arbor Day only by invoking the spirit of Prof. G. P. Marsh, as a patron-saint of climate-improving forests. Under the stimulus of industrial influences, they might transfer the cross from way-side shrines to telegraph-poles, but they would persist in the worship of sorrow.

The creed which has turned the happiest countries of our globe into a grave of their former prosperity, is a medley of miraculism and anti-naturalism, and the experience of the last century has proved that both can survive the repudiation of Rome and even of Galilee. The mania of renunciation, after the abolishment of monasteries and nunneries, continued its dismal rites in Quaker-garb and Shaker temples of celibacy. The miracle-hunger of millions who have learned to scorn the clumsy tricks of the cowled exorcist, gratifies its appetite in the mystic gloom of the dark cabinet. Rustic supernaturalists, deprived of such luxuries, indemnify themselves by retailing the marvels of the serpent-charm and joint-snake superstition.

A curious psychological problem suggests itself in the question how far the charm of the "sour-grape philosophy" may contribute to the persistence of certain forms of moral nihilism. Condemned criminals almost invariably "renounce the vanities" of a life which the Court of Appeals has refused to save, and in a scaffold-speech, quoted in Galignani's *Messenger* of May 6th, 1837, the English murderer Joseph Greenacre expressed his conviction that his crime had been the means of saving his soul, because "death on the gibbet was one of the surest passports to heaven."

For similar reasons degenerate nations, after realising the doom of their national welfare, are apt to renounce the glory of a forfeited world, and to consider misery, poverty, and shame so many stepping-stones to the bliss of a better life beyond the grave. After habitual sins against the health-laws of nature have avenged themselves in cureless diseases, decrepit bigots may find solace even in that most insane tenet of their dualistic creed which teaches them to despise the body as the enemy of the soul.

A natural effect of pessimism may thus, in course of time, become one of its perpetuating causes.

FELIX L. OSWALD.

THE NERVOUS GANGLIA OF INSECTS.

I.

ALTHOUGH the internal structure of the brain of insects has been the object of numerous and important investigations, among which we must place those of Dietl, Flögel, Bellonci, and Viallanes (who have applied the method of sections to the study of this organ), no attention has as yet been paid to the other nerve-centres of insects, and in particular to the ganglia of the ventral chain. Writers have contented themselves with describing the external form of these ganglia, and their anatomical relations to the other organic parts; but nothing has been done to throw light upon their inward structure. All the knowledge which we have on this subject is very meagre and dates far back to the works of the old writers, who, like Newport, had at their disposal no other means of study than the microscopic examination of organs viewed either transparently or in dilacerated preparations. A method so defective could render but incomplete results, and indeed in many cases erroneous ones.

We have sought to supply this much to be regretted lack of entomological knowledge, by applying to the ventral ganglia of insects the admirable method of sectional cutting, which has brought about such marked advances in contemporaneous zoölogy.

I need hardly insist on the interest of this research. We shall only remark that all anatomical study bears an unfinished aspect, up to the moment at which we grasp the meaning of the organs which we describe; physiology is a necessary complement of anatomy, it is that which gives to it a meaning. Therefore, when we dissect an

organ, which, as in the case of an insect's brain, is endowed with the most complex psychical properties of which these animals are capable, we find ourselves in the presence of parts whose functions almost entirely escape us. What is, for example, that peculiar organ to which we have given the name of the "pedunculate" body? Anatomists have described with the greatest care its connections and portrayed its external contour: but we cannot discover, or even conjecture its uses. It would be necessary to understand the habits of thought and the feelings of an insect, to be able to assign a rôle to parts so complex and so delicate as those contained within its brain.

The study of the ventral ganglia seems to us to be capable of conducting us to a better result, for in everything that concerns these nerve-masses, physiology is more advanced, and, in all cases, clearer. The ganglia of the thorax, for example, are in the main motory centres; the principal nerves that are sent out from them are to be found in the wings and in the feet: the study of the terrestrial, aquatic, and aerial locomotion of insects has already formed the subject of quite a number of important scientific works; we are now upon well-known ground, and we may hope that it will be possible to establish some connection between the anatomical structure of ventral ganglia and the functions which these ganglia control.

This hope appears to us to be the more legitimate, because we can make use of all the resources of comparative anatomy to work out the problem. If we consider any particular function, for example, that of flying, we notice that in species which resemble each other this function is exercised under totally different conditions; the same organ acquires different uses, and these variations become singularly instructive when we can trace their relationship to the particular structure of a nerve-ganglion. Thus, one of the large wings of the dragon-fly, which is almost like a bird in the range and power of its flight, becomes the elytrum of the beetle; the elytrum is a stiff wing covered by chitinised matter and serving as a protection to a part of the thorax and abdomen. Sometimes the elytrum is used in flying, as in the case of the cockchafer. In other lamellicorn insects, in the *Cetonia* for instance, the elytrum is not used in flight; it merely moves aside so as to allow the second pair of wings to un-

fold. Its rôle becomes still less active in the golden carabus, in *Procrustes*, in *Blaps*, and many other *Coleoptera*, whose two elytra are found on one vertical line, and form but one single and immovable portion; then the second pair of wings disappear; from the physiological point of view, the animal becomes apterous. In another and different order, the order *Diptera*, it is the second pair of wings that undergo an important modification; they cease to be used in flying, and are transformed into an organ of equipoise: they are used for maintaining equilibrium.

All these physiological variations, taking place in the selfsame organ, must in all probability have their counterpart in the internal anatomy of the ganglion that governs the organ, and the comparative study of this ganglion in different species will enable us perhaps to discover the functions of some of its parts. Thus, if we consider by hypothesis, as the nerve-centre of flight, some small lobe which is found occupying this or that place in a thoracic ganglion, the disappearance or modification of this lobe in species not possessing the faculty of flying, might serve to throw additional light upon such an interpretation.

What we have just said with regard to flight is equally applicable to terrestrial locomotion, which also represents in itself many varieties. The typal insect possesses three pairs of feet, whence the name of hexapods, but there are particular species which drop a pair of feet, for instance, the *Lepidoptera* of the genus *Vanessa*: in others, the physiological function of the foot varies; in the case of the carrion-beetle (a necrophagus coleopter) it serves as an instrument of tillage, to dig with; for the cricket, the third pair of feet are used for the purpose of leaping; for the *Dytiscus*, it serves as an oar, and so on. We must also bear in mind the curious fact that there exists in the larvæ of certain insects what are called supplementary feet, having only a transient existence and disappearing at maturity; the caterpillar, the larva of the butterfly, has five pairs of supplementary feet. These notable facts demonstrated by comparative anatomy, cannot fail to furnish us with valuable information concerning the functions of the complex organs found in the ganglia of the thorax.

But this is not all. We have not enumerated all the contributions of comparative anatomy to the problem which we are now about to consider; we may make use of the method of comparison without bringing the different types into juxtaposition, but by viewing the nervous system of only a single animal in its entirety. We know in fact that the body of an insect is formed by a definite number of segments, all constructed on the same fundamental plan and arranged in a linear series. Each one of these segments is joined to a nerve-ganglion, which is all its own and supplies it with sensibility and motility, the two elementary properties of nervous activity. In the course of development, these ganglia have the power of changing their positions; and it is not uncommon to find that the greater number of the abdominal ganglia move up into the thorax; each one, nevertheless, retaining its nerve-relationship to its own segment. Now all the segments of an insect's body are not called upon to play the same rôle; a division of labor has been effected among them with regard to the functions which they are found to exercise: as we have already seen, the ganglia of the thorax are essentially centres of locomotion; in the head, one of the ganglia, the sub-œsophageal, furnishes the nerves of the buccal portions; the other one, the brain, is connected with particular nerves and becomes the centre of the highest form of psychical activity of which the creature is capable. We have here a number of modifications superadded to the original plan. Yet the original plan should again be met with in the ganglia that have been least differentiated, such as those in the abdominal region; and the comparison between an abdominal and a thoracic ganglion, for instance, is well calculated to show what are the primal and fundamental structures, and what are the secondary ones which have been superadded and have become necessary for the execution of the more complex functions. The study of embryonic and larval forms so easily observed in insects, will most probably conduct us to the same result. And thus perhaps by continuous efforts, all guided by the same governing idea, we shall ultimately arrive at the analogies that exist between the cerebroid ganglia and the humblest ganglia belonging to the ven-

tral chain, and thus finally be able to understand the action of the nerve-substance.

The importance of this object, which, be it clearly understood, can never be attained except by the united effort of many workers, is well calculated to command our strenuous exertions and to encourage us in surmounting the difficulties of a study which is as yet almost entirely new.

II.

We shall restrict ourselves in this article to the consideration of one particular case; we shall describe a single ganglion of the insect. The type we have chosen, for reasons too lengthy to enumerate, is a Coleopter of the family of *Melolonthidæ;* the *Rhizotrogus solstitialis*, a small beetle very commonly found in the southwest of France. We will now proceed to the consideration of the first thoracic ganglion.

The prothoracic ganglion in the rhizotrogus is joined by very short connective filaments to the second thoracic ganglion, and also to the sub-œsophageal ganglion; this latter ganglion, we must note *en passant*, being situated in the thorax. If with a pair of scissors we sever the head of the rhizotrogus, we find that the remainder of the body contains not only the thoracic ganglia, but also the sub-œsophageal; a peculiarity which, from a physiological point of view, is very interesting.

The ganglion of the pro-thorax, which is greater in width than it is in length, bears a vague resemblance to a cone the base of which is turned towards the sub-œsophageal ganglion, whilst the apex points towards the second ganglion of the thorax. From the lower part spring two large nerves, their starting-point being nearer the ventral than the dorsal surface, a fact clearly comprehended when we find that the fibres of these nerves extend for the most part into the first pair of feet, that is to say, into those organs that lie underneath the horizontal plane of the ganglion. The connective filaments which penetrate the ganglion anteriorly enter it nearer the dorsal surface than the ventral, this last being extremely convex. Dissection throws no additional light upon the anatomy of the gan-

glion. But by means of a series of sections, we find that it is composed of a mass of fibrillar substance which occupies its centre portion and of a layer of nerve-cells surrounding the fibrillar substance. This fibrillar mass is, owing to its great volume, far the most important, and constitutes in itself alone about four-fifths of the organ. The fibrillary structure can only be satisfactorily analysed by using on it osmic acid, or other equivalent reagents which dissociate it and admit of its being reduced to a certain number of clearly differentiated elements. Whenever osmic acid or a similar reagent has not been employed, or has not sufficiently penetrated the ganglion, owing to the obstacle presented by a thick conjunctival covering or envelope, the fibrillar substance takes on a homogeneous aspect that effectually renders all analysis of it impossible. Everything depends on the employment of a good method of preparation.

When the ganglion has been properly prepared, we perceive a very material difference in the appearance of the fibrillar substance when we compare the dorsal with the ventral region of the ganglion. We can do this very satisfactorily by a longitudinal section, extending through both regions. In such a section close to the median line but not confounded with it (see Cut 16)* we perceive that the ventral region is occupied by a cord or string of substance which owing to the action of the osmic acid has become very black, and which is formed of so dense a tissue, that we can with difficulty separate it into fibres and fibrillæ. This cord, which, by reason of its position and shape, I propose naming the *ventral column*, extends over the ventral surface of the ganglion in a longitudinal direction; at both its anterior and posterior extremities it is carried on by fibres extending into the ventral columns of the other ganglia, in such a manner that the entire series of ganglia are united by one continuous ventral cord.

If we look at a transverse section (see Cut 26), the cord, which is recognised by its dark color and by its position near the ventral surface of the fibrillar substance, will be seen to have the form of two almost perfect circles. The ventral column thus presents a circular section, is duplex and symmetrical: there exist two separate

* For the cuts, see the plates in the Appendix of this number.

and distinct ventral columns, separate at least for a certain length ; a fact which must be considered in connection with the primitive duality of the ganglion.

In every section where the columns remain distinct from each other, they are separated either by fibres and conjunctival cells, or by nerve-fibres emanating from the cells of the ventral region and proceeding in an upward direction between the two columns. At the other points, the two columns join on the median line. This union is effected in different ways, either by the two columns coming directly together, thus merging into a single mass, or by a commissure which describes the arc of a circle underneath the two columns, or else by the inferior ventral lobule.

We give the name of inferior ventral lobule to a small lobule of fibrillar substance, situated beneath the ventral column. When looked at in a horizontal section not passing through the median line (see Cut 17), this lobule presents the appearance of a rounded protuberance, breaking the almost rectilinear contour of the ventral column. As this characteristic peculiarity is repeated in the internal structure of all the ganglia, we may use it to ascertain the number of the ganglia, whenever these present the appearance of being fused into one compact mass ; we may see the practical application of this remark by observing the sub-œsophageal ganglion.

In a succession of horizontal sections, the starting point of which is the ventral region, the first mass of fibrillar substance met with by the knife is the inferior ventral lobule, which is formed (see Cut 1) by two rounded fasciculi, placed symmetrically on either side of the median line and joined together by a transverse commissure.

In these sections, we also perceive fibres of the crural nerve, which, after having extended over a certain length of the ganglion, penetrate into the substance of the inferior ventral lobule (Cut 2). In transverse sections (Cut 23) we find the two ventral lobules placed beneath the two columns which they help to support, and into which they gradually merge ; and we also perceive the transverse commissure which joins the two. We shall call this the *transverse commissure of the inferior ventral lobule.*

Let us now pass on to the examination of the upper surface of

the ventral column. This surface is covered by a cluster of very fine fibrils rather sparsely disposed; we can clearly follow their course by means of a longitudinal section (Cut 17); we see them again in a horizontal section (Cut 5). To continue the general description of the ganglion we must now consider the dorsal region. It is, as we have previously stated, occupied by a fibrillar substance not so dense as that which composes the ventral column, and we will give the general name of dorsal lobe to this region, reserving the name ventral lobe for the region which embraces the ventral column and its adjoining parts. The dorsal lobe presents as its distinctive characteristic the feature that it is crossed longitudinally by a succession of con nective filaments clearly seen in the longitudinal section of Cut 16.

We have already stated that the ventral column receives fibres issuing from the ganglion in front and sends out others to the ganglia in the rear. We shall call the totality of these fibres *the connective ventral filaments*, and shall call the totality of those that traverse the dorsal lobe *the dorsal connective filaments*.

The connective filaments which join the sub-œsophageal to the first thoracic ganglion, and which, between these two ganglia, are composed of a dense fasciculus of fibres, distribute these fibres, at the point at which they enter the prothoracic ganglia, in different directions; one set of fibres proceeds towards the ventral column, these are the ventral connective filaments; a second set traverses the dorsal lobe, and are the dorsal connective filaments.

Whilst the ventral connective filaments soon merge into the very dense substance of the ventral column, the dorsal connective filaments, on the contrary, remain distinct from the organs which they traverse, and preserve their individuality throughout. They take directions in three different planes (see Cut 16), consequently they can be subdivided into superior, medial, and inferior dorsal connective filaments.

Newport seems to have observed this distinction of fibres; and he has given the name of sensory column to this first division, and that of motor column to the second. Unfortunately the drawings and figures he has published, though schematically correct, are not clear. We do not adopt his terminology, in the first place

because he designates the organs after their supposed functions, and we have made it a rule never to use controvertible physiological suppositions to designate anatomical organs; and besides, though the name of column is applicable to the connective ventral filaments, we cannot apply it to the connective dorsal filaments, which are subdivided into three pairs of fibrous fasciculi and do not in the least resemble a column.

In the study of *Melolontha vulgaris*, we have been able to establish in the most absolute manner that there exists a considerable histological difference between the connective filaments of the ventral region and those of the dorsal. Though we have not yet noticed this difference in *Rhizotrogus* in any marked degree, nevertheless it has seemed to us needful to point it out here, because the fact is of such vast importance that it cannot fail to be general. The dorsal connective filaments, whilst they preserve their individuality in their passage across the dorsal lobe of the ganglion, penetrate nevertheless into some small masses of dotted substance which are found in the path of their entrance into the ganglion. The mass annexed to the inferior dorsal connective filament, is above all very important and is directly connected with the ventral column. As the connective filaments are in pairs, each of these possesses a distinct mass of fibrillar substance and both the masses attached to the same pair of connective filaments are joined by a commissure.

Let us now say a few words about the nerves which proceed toward the prothoracic ganglion. There exists here but one single pair of nerves, extremely important and very extensive. This is the crural nerve. To this nerve are attached the organs which are superadded to the primary structure of the ganglion, such as we have described it, and which in consequence renders the primitive structure more complex. We shall perceive the importance attached to the idea of a *superadded* organ, when we study the abdominal ganglia, where the organs we are about to describe are either completely wanting or are but imperfectly developed.

If now we examine a transversal section taken a little in front of the place from whence the crural nerves emerge (Cut 19), we shall notice that the central part of the ganglion is occupied by the

ventral column and the upper part by the dorsal lobe. In addition to this, in the lateral regions of the ganglion we find two important masses of fibrillar substance. At this point these two masses remain distinct from the parts we have just mentioned, and on the other hand they are in connection with the crural nerves. The latter send a part, and unquestionably the greater part, of their fibres into the lateral lobes. In a section slightly posterior to the preceding one, also transversal, a very important change has taken place; the two lateral lobules, always connected with the crural nerves, have also established connections with the centre of the ganglion, and in the sections further on the fusion is complete. As these lateral lobules possess the characteristics mentioned, only at the point at which the crural nerves emerge, we shall call them the *crural lobes*. Thus we find in the prothoracic ganglion three principal lobes: (1) the crural lobe, which is double, symmetrical, and lateral, (2) the dorsal lobe, (3) the ventral lobe. These two last, in contradistinction to the crural lobe, will be classed together under the common term *central lobe*.

And now to finish this summary description of the prothoracic ganglion, we will point out an important disposition of the connective tissue which divides the ganglion into two halves, one anterior, the other posterior. We can easily understand this disposition by looking at a longitudinal section passing exactly through the median line. From the dorsal surface of the ganglion, may be seen descending a bundle of cells and connective fibres, which, in the form of a column, are directed toward the centre of the ganglion; these cells and fibres do not meet any important organ on their way, the dorsal connective filaments always taking a lateral course. A fasciculus, similarly composed of cells and conjunctival fibres, starting from the ventral surface of the ganglion, appears to meet this conjunctival column (Cut 18). This curious disposition appears to be, as M. Henneguy has ingeniously suggested to me, a trace of the anterior development of the ganglion which had been formed of two distinct portions that have been naturally *welded* together along the median line; the connective fasciculi corresponding to the point where the welding has been incomplete, and representing the survival of a portion of the walls of the two ganglia.

III.

As the ganglion which we have just described contains some structural difficulties not easy of comprehension, let us proceed with our description under another form, following the order of our illustrations.

Figure 1 is the first horizontal section, cut through the ventral region of the ganglion; the knife has here met the lower ventral lobule, which at this point shows itself double; the two halves being joined by a double transversal commissure. Section 2, made at a point a little higher than the preceding one, shows us at the centre the lower ventral lobule as increased in size; and in the lateral part of the figure appears a new organ, the crural lobule, which is here entirely merged into the lower ventral lobule. The crural lobule is traversed by fibres from the crural nerve, which instead of being entirely lost in its substance, proceed still further, passing into the lower ventral lobule. Section 3 merely brings into prominence an important transversal commissure. In Section 4, the inferior ventral lobule is replaced by the ventral column, which appears double, is symmetrical, and united by a transversal commissure; this commissure being formed of fibrillar substance. The ventral column is closely connected on each side with the crural lobule; it is besides crossed by the ventral connective fibres, which can be seen emerging from its anterior and posterior extremities. Section 5 allows us to examine thoroughly the disposition of those ventral connective fibres; we see that while they penetrate the ganglion, they also pass through two symmetrical masses of fibrillar substance; these two masses, which we name the anterior ventral lobules, are joined together by a transversal commissure. After having traversed the anterior ventral lobules, to which it appears they give a portion of their fibres, the ventral connective filaments pass through the ganglion in an antero-posterior direction, and we see them penetrating the two posterior ventral lobules. The last named lobules, which remind us by their position and appearance of the anterior lobules, receive in addition fibres issuing from the crural lobules; but they do not receive them all, because we notice quite a number of these fibres advancing

directly into the second thoracic ganglion. After emerging from the posterior ventral lobules, the ventral connective filaments pass into the second thoracic ganglion, where we see them penetrate into the anterior ventral lobules.

With Figure 6, we leave the ventral lobe of the ganglion and come to the lower portions of the dorsal lobule. The important filaments crossing this section from the front to the back are called lower dorsal connective filaments. We notice as they proceed some small masses of dotted substance, and, in addition to these, dark colored dots which are the result of the knife having cut crosswise through several fascicles of ascending fibres. We shall find out by means of the sections taken from different parts and placed so as to allow of our better observation, what these ascending fibres are. The crural lobule, always exhibits the same characteristics. We have given it a homogeneous aspect in our drawing. As a fact it presents in its sections a vast number of structural details. But these details being very difficult to understand, we prefer not to dwell upon them.

Section 7 passes through the very midst of the lower dorsal connective filaments; these filaments being in two pairs, one external and the other internal. The external pair, situated somewhat lower, has here disappeared, and the inner pair is the only one to be seen. Some transversal fibres, whose direction appears to me difficult to follow, divide the inside dorsal connective filaments at two different points, and assume the figure of a square; this square has two black dots, produced by the section of the ascending fibres.

A little higher, in Figure 8, the lower connective filaments have disappeared and the fibrillar substance of the ganglion is furrowed by long transversal fibres, of which a part seems to serve the function of joining the two crural lobules, whilst the remainder, proceeding towards the black dots before mentioned, continue their progress with the fasciculi of ascending fibres. These are no other than ascending fibres which, having changed their direction at the plane of the section, proceed almost in a horizontal plane. In Section 9 we follow the course of the medial dorsal connective filaments, separated from the lower connective filaments by the fibres having a

transverse direction, seen in Figure 8. The medial dorsal connective filaments are four in number, an outer pair and an inner pair. At the moment when they leave the prothoracic ganglion, they cross a region where the fibrillar substance is both thicker and darker. In Figure 10 the medial connective filaments are on the point of disappearing; they receive certain fibres coming from the crural lobules, which are now reduced in dimensions. Section 11 shows us the lower dorsal connective filaments, which are the slenderest of all and of which there are but one pair; the crural lobule now disappears. In the middle of the figure, we observe a small collection of conjunctival cells which, as we have supposed, indicates the point where in the course of development the two symmetrical portions of the ganglion have not been perfectly fused together. Finally Section 12 shows two lateral masses of fibrillar substance, separated by a strip of conjunctival membrane.

We will now take up the series of longitudinal sections, the study of which will demand very special attention. We shall there meet again with the organs which we have already examined in the horizontal sections; and we shall perceive that the alterations and modifications presented to us by the difference in our point of observation, bring out very important changes in the appearance of those organs. The sectional method of examination is also one of analysis. In order to reconstruct an organ in its complete form and to conceive of it in space, our mind must bring into a single focus what the sections have represented in a fragmentary manner: we must, in short, substitute synthesis for analysis.

Figure 13 represents the first and exterior longitudinal section; it hardly touches the ganglion; in the front we see the starting point of the crural nerve, and also a portion of the periphery of the crural lobule. The crural nerve exhibits several roots, the most important of which occupy the ventral region. Figure 14, though very elementary, brings out many important points; we see here the crural lobule, which has increased in size and extends from the ventral to the dorsal region; a fact which has already been indicated in the horizontal sections, the crural lobule having been shown in them at all points. This lobule is almost circular in form.

Along its ventral region, we perceive some of the fibres of the crural nerve which do not penetrate into the lobule; these are the ones we met with in the figures 2 and 3: they are the fibres which pass directly into the lower ventral lobule. With Section 15, we leave the lateral regions of the ganglion and come to the dorsal and ventral regions; we must notice that the crural lobule is continuous with the central fibrillar mass and has no precise limits. In Section 15 the ventral column appears, reduced in size. In the front of it we observe an incisure through which certain nerve-cells send their prolongations into the fibrillar substance.

Figure 16 shows us the complete junction of all the connective filaments traversing the ganglion; first the ventral column, with the connective ventral filaments starting from both its extremities; and then the three dorsal connective filaments, which preserve their individuality distinct, while they cross the dorsal lobe of the ganglion. The lower dorsal connective filament is distinguished from the others by a small compact mass of fibrillar substance through which it passes. We must note that the fibrillar substance becomes thicker at the point where the whole series of connective filaments enter the ganglion, and the same thing is repeated at the place where they leave the first thoracic ganglion to enter into the second. The ventral column is distinguished from the other parts of the ganglion by the dark color which it assumes through the action of the osmic acid; it presents black granules which, examined with a strong lens, show small fasciculi of fibres running in a parallel direction. The cells which line the lower surface of the ventral column do not throw out any prolongations; they are exceedingly small, but do not otherwise present any special feature.

Figure 17 is but very slightly different from the preceding one: the ventral column is simply strengthened on its lower surface by the lower ventral lobule. The position of this lobule is interesting to note. We have already mentioned that each ganglion is divided into two halves by a column of conjunctival tissue, one anterior and the other posterior. In Section 17 we see the granulated projection of the ventral portion of this conjunctival column. In order to simplify it we have shown no conjunctival tissue in our illustra-

tion. We may nevertheless notice, that the nerve-cells at the point marked *c. c.* seem to separate one from the other, and show a triangular space between them, filled with conjunctival cells. If the segment had not been cut so obliquely, (and this obliqueness in the sections is almost unavoidable when dealing with such very small organs,) we should also perceive on the dorsal line of the section the projection of the dorsal part of the conjunctival column: in fact we shall see this projection in the figure which follows. The presence of the conjunctival column separates, as we have said, each ganglion into two parts, one anterior the other posterior. These portions are not at all symmetrical. We see in Section 17 that the lower ventral lobule is found only in the anterior part. Finally from the ventral column rises an important fasciculus of ascending fibres, which we have already seen in the horizontal diagrams: it is difficult for us to ascertain what these fibres are. In the 18th and last section we approach nearer the median line. The ventral column at this level has the appearance of being divided into two trunks. The ventral connective filaments are clearly seen upon its upper surface. Among the dorsal connective filaments the middle one alone remains visible and receives a certain number of fibres from the ascending fasciculus.

To complete our description let us glance at the series of transverse sections. In Figure 19 the two crural lobules have not yet united and are not yet merged into the dorsal-ventral lobe. This junction does not take place until we come to Figure 20. Here, at this level, we see in addition the circular segment of the two ventral columns, which by their dark color are sharply outlined against the remainder of the fibrillar substance. To the right and left of these two columns we perceive small masses of dotted substance: we merely call attention to them and shall not describe them. Figure 21 furnishes no noteworthy modifications of the preceding. We simply see a few cells of the periphery sending out their prolongations into the fibrillar substance. The point at which they thus penetrate it has already been indicated in Figure 15. In Figure 22 we have a section of several dorsal connective filaments: among others a lower root of the crural nerve is here seen to pass along the ven-

tral surface of the fibrillar substance without penetrating into the crural lobule. Does there exist an upper root of the same nerve, which follows the upper surface of the dotted substance? We do not dare to decide the question. One thing is certain, and that is that if the nerve does exist it is accompanied along its path by a great number of widely ramified tracheæ, of which we see a drawing in *tr*. In the three figures which follow (23, 24, 25) the ventral column presents an interesting series of modifications. First of all, in Figure 23, it is surrounded by the lower ventral lobule, of which the two masses are in a lateral position, and whose commissures pass underneath the column. We see in the same Figure 23 the two lower roots of the crural nerve, advancing towards the column. In the 24th section the two roots have reached the column, and two other nerves cross the crural lobule; doubtless their destination is the lower dorsal connective filaments, but of this we have no clear indication. In the 24th section two other crural roots also enter the lower ventral lobule. This section is very favorable for the examination of the ascending fasciculus which we have already noticed in the longitudinal sections. It seems to us certain that this fasciculus terminates in the middle dorsal connective filament. Its origin is more uncertain. It seems to spring from the ventral column, or else to come from crural roots which, after having traversed the crural lobule, reascend towards the dorsal lobe of the ganglion, describing a curve exteriorily concave. It is possible that this ascending fasciculus has both these origins. The 26th and last section shows us the ventral column on a larger scale; the two columns being distinct from each other, though united at the lower extremity by a commissure. The *ensemble* of the figure strikingly reminds one of a section of the abdominal ganglion.

Here our description ends. We have not sought to follow up every fibre in all its details, nor to describe completely the anatomy of each organ. Our intention has merely been to give a synthetic notion of a nervous ganglion. Subsequent studies made on other ganglia will demonstrate the general application of this idea.

ALFRED BINET.

HINDU MONISM.

WHO WERE ITS AUTHORS, PRIESTS OR WARRIORS?

AMONG all the forms of government class government is the worst. Carthage was governed by merchants, and the mercantile spirit of its policy led finally to the destruction of the city. Sparta was governed by warriors, and in spite of the glory of Thermopylæ it was doomed to stagnation. India was governed by priests, and the weal of the nation was sacrificed with reckless indifference to their interests. It appears that for the welfare of the community the harmonious co-operation of all classes is not only desirable but also indispensable.

Yet it is often claimed that mankind is greatly indebted to nations or states ruled by class government, for having worked out the particular occupation of the ruling class to a perfection which otherwise it would not have reached. This is at least doubtful.

Carthage was eager to establish monopolies, but she contributed little to the higher development of commerce and trade among mankind.

Sparta raised brave men, but was not progressive, even in the science of war, and was worsted by so weak an adversary as Thebes. Modern strategists could learn something from Epaminondas, but little, if anything, from the Lacedæmonians.

Priestcraft has attained to a power in India unparalleled in the history of other nations, and it is no exaggeration to say that priest-rule was the ruin of the country. Yet the wisdom of the Brahmans has become proverbial. Their philosophy is praised as original and profound, and it is well known that the first monistic world-concep-

tion was thought out in ancient India. But we shall see later on what the real share of the Brahmans in this great work has been

In the very earliest ages of Hindu antiquity, revealed to us in the songs of the Rig-veda, we meet with priests who claimed the power of making sacrifices to the gods in a manner especially acceptable to them, and who thus rose to great power, influence, and wealth. To this ancient period of Hindu history we can trace the origin of the Hindu castes, essentially a result of priestly egotism, and which up to this day has weighed down the Indian people like a nightmare. The organisation of the priestly class into an exclusive, privileged body, as well as the final development of the castes, did not, however, take place until the time represented by the second period of the ancient Hindu literature; by the literature, that is to say, of the Yajur-vedas or the Vedas of the sacrificial formulæ, and the Brâhmanas and Sûtras, both of which describe the sacrificial ceremonies, the former with, the latter without theological comments. The contents of these works illustrate the origin of the Hindu hierarchy and castes; but it is often necessary to read between the lines. The greatest authority on this rich literature, Prof. A. Weber, of Berlin, in the tenth volume of the series "Hindu Studies" which he edits, has published his inquiries concerning this subject in a very learned treatise, entitled "Collectanea über die Kastenverhältnisse in der Brâhmana und Sûtra," of which I have made considerable use in the following pages.

In these books the Brahmans assert their claims with startling candor. In several passages—to begin with the most striking feature—they announce themselves as real gods wandering on earth. "There are two kinds of gods," it is said, "the true gods and the learned Brahmans, who recite the Veda." "The Brahman represents all gods." "He is the god of gods." This is perhaps the most remarkable instance of priestly arrogance in all history. Thus it cannot at all surprise us that the Brahmans, as earthly gods, placed themselves above king and nobility; but it appears rather strange that the kings and warriors should have allowed to them the first place in the government. But as a matter of fact, they did do so and were compelled to do so. From mysterious legends in the great

Hindu epic poem we infer, that bloody wars have been waged for supremacy, in which the nobility was defeated.

The legends of this epos are thus important additions to the sources with which we are concerned. This struggle, which the Brahmans in all likelihood caused to be fought out for them by the great masses of the people, has been ascribed to the warriors having robbed the priests of the treasures which the latter had acquired by the performance of the sacrifices; and this part of the legend is so highly probable that we cannot treat it as a pure myth, especially if we take into consideration the circumstances of those times. It was the first attempt at secularisation in the history of the world, and the results were very disastrous to those who were then in secular power.

The Brahmans did not establish a social hierarchy or ecclesiastical ranks, nor did they participate in the government, except that the king was bound to employ a Brahman as Purohita or house-priest, who occupied as such the position of prime minister. If, however, they succeeded in dominating the nobility and the whole people, it was principally on account of their greater knowledge, of which they boasted, and especially on account of the sacrificial arts, by the proper exercise of which in those times, all favors could be obtained from the gods. For a duly performed sacrifice, which would last weeks, months, nay, years, the Brahmans charged of course a high fee. A fee of ten thousand oxen was prescribed for a certain ceremony, a hundred thousand for another one, and a later teacher of ritualism charged 240,000 for the same service. And this was not yet the climax of priestly avarice, which—to use an expression of Professor Weber—indulges in veritable orgies in these books. After one has gone through the endless description of a ceremony, one finds at the end the remark that the whole sacrifice has no effect, unless the proper fee be paid to the priest. And—to use a term of modern life—lest competition should reduce the prices or spoil the business, a rule was established, that no one should take a fee which another one had refused. (Weber, p. 54.)

The sacrificial rituals, so trying and tedious for us, are the only literary production of these dull centuries before the rising of phil-

osophical speculation, and the great historical importance they possess is simply due to the light they throw on the moral depravity of the Brahmans as a class.

The following fact will fully show to what extent sexual debaucheries were indulged in. The priest was enjoined, by a special rule, not to commit adultery with the wife of another during a particularly holy ceremony. But he who could not practice continence, was allowed to expiate his sin by an offering of milk to Varuna and Mitra.

Numerous passages in the books on ritualism furnish us interesting illustrations of the great indulgence which the Brahmans had for each other's weaknesses. The officiating priest is taught how to proceed during the sacrifice, if he wants to wrong the man who employs and pays him, or how to deviate from the prescribed rules, if he wants to rob his employer of his seeing, hearing, children, property, or position. The lack of confidence that resulted is best illustrated by a ceremony, the introduction of which, at the beginning of the sacrifice, became gradually necessary. By a solemn oath the officiating minister and the client bound themselves not to injure each other during the performance of the holy act. Consequently, the strange notions of right, which the Brahmans had in those times, will not surprise us. "Murder of any one but a Brahman is no murder." "An arbitrator must decide in favor of the Brahman and not in favor of his opponent, if the latter is not a Brahman." Such maxims are laid down in the texts with shameless insolence.

It is plain that the caste system greatly contributed to increase the power and influence of the priests, because in a country where the people are divided into classes, the priest always succeeds in inciting at his wish the one against the other.

After the Brahmans came as second caste the Kshattriyas (literally: the ruling class, i. e., king, nobility, soldiers); and as third caste the Vaisyas (the bulk of the people: farmers, merchants, etc.). The conquered non-Aryan aborigines were foreordained by the gods to serve the Aryan castes and especially the Brahmans. They were called Súdras (serfs) and had neither civil nor religious rights. "The Súdra is the servant of others; he can be cast out or killed."

By this humane maxim were the Brahmans guided in their conduct towards the aborigines.

With such a state of things, as it appears in the old books, the priesthood ought to have been well pleased. But the Brahmans were not; they desired still greater advantages and carried out the caste system to a most absurd extent. The result is embodied in the famous law-book of Manu, the exact date of which we do not yet know, but which must be placed at the beginning of our era. The condition of things of which I shall now speak, was accordingly developed during the last centuries before Christ. Though we may suppose that some rules of this code have remained a mere theory and have never been carried out, there remains enough to show the social life of those times in a poor light. Köppen, in the first chapters of his book on Buddhism, has severely but justly judged the social organisation, as it appears in Manu's law-book; but as the age of this code was overrated at his time, he was led to one erroneous conclusion: he attributes the historical process, of which we speak, to the period before Buddha, while it really took place after Buddha. L. von Schröder, in his work "Indian Literature and History," in the twenty-ninth lecture, gives us a good view of those times.

Different passages in Manu's code show us that the claim of the Brahmans to divinity had not decreased in the course of the centuries. "The Brahmans are to be venerated at all times, as they are the highest divinity." "By his very origin the Brahman is a god, even to the gods."

The many practical privileges they enjoyed were of still greater value. They were exempt from taxation under all circumstances, "even if the king should starve." For the greatest crimes they could not be executed or chastised, nor was their property liable to confiscation, while at the same time the criminal law was very harsh towards the other castes and especially towards the Súdras. The penalties increased proportionately: the lower the caste to which the criminal belonged, the higher the punishment; and the fines also increased in proportion to the rank of the caste to which the injured man belonged. The money-lender was allowed to exact (monthly)

two per cent. of a Brahman, three of a Kshattriya, four of a Vaisya, five of a Súdra. All these laws show how the Brahmans understood the art of advancing their interests. The Súdra was by the code deprived of all rights. "The Brahman may consider him as a slave and is therefore entitled to take his property, as the property of the slave belongs to the master." "The Súdra shall not acquire wealth, even if he be in a position to do so, as such conduct gives offense to the Brahman."

But all these things are harmless when compared with the principles by which the Brahmans reduced to the most miserable of lives numberless human creatures who had committed no wrong except that their origin did not agree with the political scheme of the priests. Formerly it had been lawful for the members of the three Aryan castes, after having married a girl of the same caste, to take other wives of a lower caste besides, and no disgrace attached to their children. The son of a Brahman and a Vaisya—or even of a Súdra woman—was therefore a Brahman. But this was no longer the case under the code of Manu.

If the parents belonged to different castes, the children did not follow either father or mother, but they formed a mixed caste and the law distinctly regulates their occupations and trades. This theory gave birth to a great number of mixed castes, who were more or less despised. And the social standing of many of them grew still worse on account of an absurd maxim which degraded the Indian people to the level of grass and plants. Good seed in a bad soil gives of course a poorer return than in good soil; still the crop is endurable. But weed introduced into good soil produces weed abundantly. According to this theory of the Brahmans the children were below the father, if he had married a wife of a higher caste. The lowest and most execrable creature therefore is the son of a Súdra and a Brahman woman. The destiny of a Súdra was of course hard and unhappy, but the misery of the offspring of such a marriage, of the Chandâla, defies all description. "He shall live far from the abodes of other men and bear signs by which everybody can recognise and avoid him, as his contact pollutes. Only in daytime shall he be admitted into the villages, as then people can avoid him. He shall

possess but common animals like dogs and donkeys, eat out of broken plates, put on the dresses of the dead, etc. They were compelled to serve as executioners. To the utmost degree of contempt and misery has the proud Brahman reduced these poor creatures." (Schröder, pp. 423-424.)

But the Chandâla was not the last in the Brahmanic scale, which suppressed all dignity in human nature; his offspring, though he had only a wife of the Súdra caste, was necessarily still below him. Thus originated a great number of mixed castes, one more despised than the other, and despising one another. Most of these outcasts take their names from the Indian aborigines and are thus placed on the same level with the most contemptible tribes. Some of the things I have cited about the mixed castes, may have been merely a theory of the Brahmans: however, the actual existence of classes of people reduced by the clergy to a sort of animal life, has been sufficiently verified by foreign travellers.

In modern times the separation of the people has been going on very rapidly: so much so, that nearly every trade or profession now forms a caste of its own, having no social intercourse with, nor patriotic feelings for the other castes. This condition of things is due to the influence of the Brahmans, for it has grown out of the social order they have founded.

It is not my task to arraign the Brahmans for the sins they have committed; but simply to illustrate to my readers, how little they cared for and had at heart the interests of their people. One will, upon the whole, feel inclined to denounce the selfishness and immorality of the Brahmans, but on the other hand will acknowledge with admiration the intellectual work they have done, and forgive them much for the profound thoughts with which they have enriched their country and the whole world. Is it not the wisdom of the Brahmans that has given to the word India a sound that stirs the hearts of all to whom the struggle for the highest truth appears as the highest phenomenon in the history of civilisation? But suppose it can be shown that the greatest of all the wisdom of the Brahman, the monistic doctrine of the All-in-One, which has had the

greatest influence on the intellectual life of modern times, was not discovered by them ?

Before I enter on this question, of the greatest importance from an historical point of view, I will give a short sketch of the period of Indian history in which this doctrine was established.

For centuries the Brahmans had heaped sacrifice on sacrifice and multiplied symbolical explanations without end. All this distinctly bore the stamp of priestly sophistry. Suddenly higher thoughts arise. The learning handed down by tradition and the sacrificial system are, it is true, not altogether abandoned ; the mind, however, is no longer satisfied with the mysteries of the sacrifices, but aims at higher and more sublime truth. The age of intellectual darkness is followed by a new era, the characteristic of which is the ambition to solve the problems of life and to understand the relation of the individual to the absolute. All the efforts of the human mind are now bent on solving the question of the eternal Unity, from which all phenomena have emanated and which every one perceives within his own self. It is the age of the Upanishads, those famous books, which, as soon as they were known in Europe, filled all scholars with wild enthusiasm and admiration. I refer only to the old Upanishads, that date from the eighth to the sixth century B. C., not to the great number of books of the same name, but not of the same value—there are over 200 of them—which appeared after the Christian era. The Upanishads reveal the struggle of the mind to reach the highest truth. Though they indulge occasionally in strange speculations, still the idea of Brahma, of the universal soul, of the absolute, of the thing in itself, is the ever-recurring subject of their thoughts, which culminate in the idea that the Atman, the inner self of man, is naught but the eternal and endless Brahma. A wonderful pathos animates the language of the Upanishads and testifies to the sublime feelings in which the thinkers of those times sought the great mystery of existence. They look for all kinds of expressions, metaphors and figures, in order to couch in words what cannot be described by words. We read for instance in the venerable Brihadâranyaka Upanishad : "That which lives on the earth, but is different from the earth, that which is the moving power of

the earth, that is your Self, the inner immortal ruler." The same is predicated of water, fire, ether, wind, sun, moon, and stars; and then the chapter ends as follows: "Unseen, he sees; unheard, he hears; unminded, he minds; unknown, he knows. There is none that sees but he; there is none that hears but he; there is none that minds but he; there is none that knows but he. He is thy soul, the inner ruler. Whatever is different from him, is perishable."

In the same celebrated Upanishad appears a woman, named Gârgî, and moved by thirst of knowledge she inquires of the wise Yâjnavalkya: "That which is beyond the sky and beneath the earth, and between sky and earth, that which is, was, and shall be, in what and with what is it interwoven (that is: in what does it live and move)?" Yâjnavalkya, in order to try the intellectual power of the woman, gives an evasive answer: "In the ether." But Gârgî, perceiving that this answer did not contain the final truth, asks: "In what is the ether woven?" And Yâjnavalkya replied: "O Gârgî, that is what the Brahman calls the Eternal: it is neither big, nor small, nor large, nor short, without connection, without contact: by the Eternal are ruled heaven and earth, sun and moon, days and nights; the power of the Eternal directs the rivers south or west or to any other point of the compass. Whoever parts from this world without having understood the Eternal, is miserable."

In the Chândogya Upanishad, a book of no less importance, the same wisdom is taught by a man named Uddâlaka to his son Shvetaketu in the form of several parables. We see them standing in front of a Nyagrodha tree, that kind of fig-tree that everywhere sends roots from the branches down to the ground, thus producing new trunks, until in the course of time *one* tree resembles a green pillared hall. And in front of such a tree, the most beautiful symbol of ever-youthful nature, the following conversation takes place between father and son: "Get me a fruit of this tree."—"Here it is."—"Break it."—"It is broken."—"What do you see in it?"—"I see quite small kernels."—"Break one of them."—"It is broken."—"What do you see in it?"—"Nothing."—Then the father said: 'The fine matter that you cannot see has produced this big tree,

and believe me, my dear son, this same matter, of which the earth is composed, is the Absolute, the Universal Soul,—it is you."

The eternal ground of all existence which every one carries in himself, Being as it is in itself, and as it is immediately perceived in thinking, was, accordingly recognised as the sole reality, and all the manifold changes of the phenomenal world were called Maya, a sham, a delusion, a mockery of the senses. We see, it is a consistent monism which is taught in the Upanishads.

I do not intend here either to criticise the Brahman conception of monism or to contrast it with modern forms of monism. All monisms have at least one thing in common, viz. they all recognise the paramount importance of consistency of thought as a basic principle in philosophy. And to have propounded a monism for the first time is a feat which cannot be overestimated. What remains of this essay will be devoted to the investigation of the question, whether this feat is duly or unduly credited to the Brahmans.

It may first be mentioned, that a few scholars like Weber, Max Müller, Regnaud, Deussen, and Bhandarkar, pointed out, a long time ago, certain facts which show that another class of the Hindu nation founded the monistic doctrine of the old Upanishads. But the attention of the great public has never been called to this subject, which deserves to be known by all interested in Indian history.

In the second book of the Brihadâranyaka Upanishad, of which I have already cited two passages, is found the following story, of which also the fourth book of Kaushîtaki Upanishad gives a slightly different version.

The proud and learned Brahman Bâlâki Gârgya comes on his journey to Ajâtashatru, prince of Benares, and says to him: "I will announce you the Brahma." The king, highly pleased, promises him a great reward, a thousand cows. The Brahman begins to expound his wisdom: "The Spirit (that is the power) in the sun I venerate as the Brahma." But the king interrupted him, saying that he knew that already. Then the Brahman speaks about the Spirit in the moon, in lightning, ether, wind, fire, water, but the king knows all that. And whatsoever the Gârgya might say, is not new to the king. The Brahman became silent. But Ajâtashatru

asked him : "Is that all?" and Gârgya answered : "Yes, that is all." Then the king said : "Your little knowledge is not the Brahma;" whereupon Gârgya declared that he should like to be one of the king's pupils. Ajâtashatru replied : "It is against nature, that a Brahman should learn from a warrior and depend on him for the understanding of the Brahma, but I will show it you nevertheless." The king took him to a sleeping man and spoke to the latter; but he did not get up. When the king touched him with his hand, he arose. The king then asked the Brahman : "While this man was sleeping where was his mind, and whence did it return now?" Gârgya could not give an answer. Then the king explained to him, that the mind or the Self of the sleeping man was wandering around in dream, that all places were open to him, that he could be a great king or a great Brahman; but that there was still a higher condition of felicity, that is, absorption in dreamless sleep, without consciousness. In this condition the Self of man, not affected by the outside world, reposes in his true essence and knows no difference between Atman and Brahma.

Another story, reported in the fifth book of Chândogya Upanishad and in the sixth book of Brihadâranyaka Upanishad, is perhaps of still greater importance.

The young Brahman Shvetaketu comes to a convention, where the King Pravâhana Jaivâli asks him : "Has your father instructed you?"—"Yes, sir."—"Do you know to what place the dead go?" And three more questions he put to the young Brahman, who was compelled to admit that he knew nothing about them. Discouraged, he returned to his father and reproached him : "Although you have not imparted any knowledge to me, you claim that you have instructed me. A *simple king* has asked me three questions and I could not answer a single one." The father replied : "You have known me sufficiently to understand that I taught you all I knew. Come, let us go to the king and learn from him." The king received the Brahman with great honors and requested him to select a present. But Gautama refuses all earthly gifts, gold, cows, horses, female slaves, and asks the king to answer the questions he had put to his son. At first the king was unwilling, but after a while he agreed

to it and said, that no one on earth could give information on those subjects, except a warrior. And the following words of the king's are very significant: "Would that neither you nor your ancestors had trespassed on us, that this truth might never have set up her residence among Brahmans. But to you, since you are so inquiring, I will communicate our wisdom."

Substantially the same story is found at the beginning of the Kaushîtaki Upanishad, except that the king appears under the name Chitra.

Omitting points of less importance, I shall only give in a brief form the contents of the eleventh and the following chapters of the fifth book of the Chândogya Upanishad, where again a man of the warrior caste, Ashvapati, prince of the Kekaya, is shown in possession of the highest wisdom. A number of highly learned Brahmans were speculating on the following problems: "What is our Self? What is the Brahma?" and they decided to go to Uddâlaka Aruni, who, as they knew, was investigating the "Omnipresent Self." But Aruni said to himself: "Now, they will ask me and I am not able to answer all their questions"; consequently he requested his visitors to go with him to Ashvapati. The latter receives them with great honors, invites them to stay with him, promising them presents as high as their fees for sacrifices. But they replied: "A man must communicate what he knows. You are just now seeking the 'Omnipresent Self'; disclose to us what it is?" The king said: "I will answer you to-morrow." The following day, without having received them among his pupils, that is, without a ceremonial reception as was usual, he asked them: "What do you venerate as the Self?" They replied: "Heaven, sun, wind, ether, water, earth." The king reminded them that they were all mistaken in considering the Omnipresent Self as a finite and limited being; it was the infinite, the infinitely small and the infinitely great.

The weight of these stories is very plain. Whether they refer to real facts or merely reflect the views of those times in the form of legends, cannot be decided. However, the question of the historical truth of these stories has no bearing whatever. The fact that they are to be found in genuine Brahmanic writings, in books which are

considered in India as the basis of the Brahman caste, speaks a plain language. It shows, that the thought of claiming the monistic doctrine of the Brahma-Atman as the inheritance of their caste, did not occur to the authors of the old Upanishads, or that they dared not claim it: it may be that they did not yet realise the great importance of the same. Of course in the following ages this science became the exclusive property of the Brahmans and was cultivated and developed by them during twenty centuries—but this does not do away with the fact that it originated among the warrior caste. The men of this caste recognised at once the hollowness of the sacrificial system and its absurd symbolical character: and to them is due the credit of having disclosed a new world of thought and of having accomplished a revolution in the intellectual life of Ancient India. When we learn that the Brahmans continued the sacrificial system, even after having adopted the new creed, and by representing religious ceremonials as the first step to knowledge, thus combined two wholly heterogeneous elements: we may justly conclude that things have taken the same course in Ancient India as in other countries. Progressive ideas are first opposed by the priesthood, their born enemy, until they have become so powerful that they cannot be opposed any longer, whereupon the priest adopts them and tries to harmonise them with his superstitions.

But the ideas mentioned in the preceding paragraphs, the substance of what is commonly called "Hindu wisdom," are not all that the warriors have done for the religion and philosophy of the people. The noble Gautama of Kapilavastu, the best known of all Hindus, who established Buddhism about 500 years before Christ, was also a Kshattriya, and according to the more recent tradition, which alone was formerly known, the son of a king; but according to the earlier sources, disclosed by Oldenberg, he was the son of a landed proprietor. Buddha, "the Enlightened," under which name he is known all over the world, most strenuously opposed the sacrificial system and the superstitions of the Brahmans. The ceremonies and the science of the priesthood seemed to him a perfect fraud, and the caste system an absurd institution: he taught that the final beatitude is within the reach of the lowest man, as well as of

the Brahman and the king; that every one, without distinction of birth, can attain to "salvation" by contempt of the world, self-denial, and devotion to the welfare of his fellow beings.

Oldenberg's excellent book on Buddha, the newest standard work on this subject, makes it unnecessary for me to dwell at length on the doctrine of the greatest of all Hindus; only in regard to one important point, which has a direct bearing on the subject under consideration, do I differ from his opinion. According to the oldest sources, Buddha's method of teaching is, to a great extent, beyond the understanding of the bulk of the people; not a popular, but an abstract philosophical one. For intrinsic reasons, I believe that the old sources do not give a correct report of this matter, and we must not forget that centuries separate them from Buddha. Oldenberg himself raises the point, whether the dry and tedious ecclesiastical style, in which Buddha's thoughts are clothed by those sources, truly reflects the spoken word. He says on page 181: "Whoever reads the words which the sacred books attribute to Buddha will doubt that the form in which Buddha taught his precepts is to be identified with that abstract and sometimes abstruse metaphysical language. A youthful, invigorating spirit, pervading alike teacher and disciples, is the true picture of those times, admitting of no unnatural or artificial features."

In spite of this, he comes to the conclusion that "the solemn and stern way of speaking, peculiar to Buddha, has been better expressed by tradition than by what we would feel tempted to substitute." I am not of this opinion. In India a great success could not have been obtained but by overpowering eloquence and a popular method, intelligible to all, and proceeding by parables and metaphors.

If Buddha had only appealed to the intellect of his nearest surroundings, consisting merely of aristocratic elements, if he had not found his way to the heart of the people, his monastery would very likely have shared the destiny of the other religious congregations of his age, which have all disappeared, except one. As the doctrines of these monasteries or their founders do not substantially differ from each other, and as it cannot be ascribed to mere chance that

Buddha's doctrine has developed into a universal religion, having the greatest number of adherents, there remains but one hypothesis to account for this fact, and that is the superiority of Buddha's way of teaching. The erroneousness of the generally prevailing opinion that Buddha was in his time the only founder of a new religion, and that he suddenly revolutionised the social organisation of the Indian people, has been clearly established by recent investigations. In fact, he was a "primus inter pares," one of those numerous ascetics who were striving for and preaching "liberation" from the eternal transmigration.

Besides Buddha's, only one congregation has survived: the Jaina, having numerous members in the western part of India. The principles of the Jaina are very similar to those of Buddha; so much so that until recently it was considered merely as a sect of Buddhism, while it is really a religion of its own, founded by a contemporary or a predecessor of Buddha, named Vardhamâna Jnâtaputra—in the language of the people, Vaddhamâna Nâtaputta—in the same part of the country where Buddha rose. The only difference between the two religions is this: Vardhamâna lays great stress on castigation; while the more progressive Buddha declares it useless —nay, pernicious. The important point in regard to the object of our essay is this: that the founder of Jaina, which occupies a high place in the history of Hindu culture, was also a member of the Warrior Caste.

We shall now have to consider another production of the Indian mind, the very name of which is unknown to most of our readers, although it offers the most interesting religious problems. I refer to the doctrine of the Bhâgavatas or Pâncharâtras. These names, of which the former is the earlier and original one, designate a religious sect in North India, whose existence in the fourth century B. C. is authentically proved, but which can be placed with great probability in the time before Buddha. They professed a common-sense monotheism, independent of the traditions of the old Brahmans, and venerated God under different names: Bhagavant, "The Sublime," whence their name is derived; Nârâyana, "Son of Man;" Purashottamma, "The Supreme Being"; but generally under the nam

Krishna Vâsudeva, "Son of Vâsudeva". The character of their worship produced feelings identical with the Christian love and devotion to God. The Hindu word for this feeling is Chakti, and for him who was penetrated by the same, Chakta. As the word Chakti cannot be found or has not been found in the Hindu literature earlier than the era of Christ, several scholars are inclined to attribute the Chakti to the influence of Christianity, especially Professor Weber, who deserves the highest praise for his researches concerning Krishna worship. Weber has proved in several of his books, especially in a highly interesting treatise on Krishna's birth, that numerous Christian notions have entered into the later Krishna legends (the similarity of the names, Krishna and Christ, accounts for it): for instance, the birth of Christ among the shepherds, the story about the stable, and others of the same kind. In spite of this, I cannot embrace the opinion that the Chakti has been brought from a foreign country, because its first appearance belongs to a period in which Christian influences cannot be found. As I cannot go into details without discussing very difficult points, requiring a great deal of erudition, I will only say that whoever is familiar with the old Hindu civilisation will easily understand that the Chakti is of genuine Hindu origin. Monotheistic notions can be traced to the oldest periods of Hindu antiquity, and the Hindu mind has always been animated by a high aspiration towards God; so that it should not surprise us that this feature of the Hindu character has produced a religion popular and independent of philosophical speculation, consisting in love and devotion to God. The founder of this religion was Krishna Vâsudeva, afterwards raised to divine dignity, or rather identified with the deity; from his name and from the legends attached to his name, he was a member of the Warrior Caste. As early as the epoch of the Mahâbhârata, the great Indian epic poem, the Brahmans appropriated to themselves the name and work of Krishna, and transformed the venerated hero into the God Vishnu; thus increasing their strength by adopting a doctrine not of Brahmanic origin.

We have thus found that the profound philosophical monism of the Upanishads, the highly moral religions of Buddha and Jaina,

and last, not least, the creed of the Bhâgavatas, based on pure devotion to God, did not originate among the Brahmans.

However favorably we may judge of the achievements of the Brahmans in all branches of science, and I am far from vilifying their merits, still it is certain that the greatest intellectual performances of India, nay, all such in India that have been beneficial to mankind, were accomplished by men of the Warrior Caste.

RICHARD GARBE.

THE IDEA OF NECESSITY, ITS BASIS AND ITS SCOPE.

THE idea of necessity, although a fundamental concept in philosophy and science, has not as yet been so clearly defined that all thinkers would agree as to its meaning and significance. Necessity is frequently identified with compulsion, and thus it is supposed to be incompatible with freedom of will. It is also identified with fate, as if it were a destiny that existed above the will of man and the powers of nature, similar to the Moira of the ancients. It is said to exclude chance in every possible conception of the term and to cause the evolution of the world to proceed by a predetermined arrangement, like the mechanism of a clock.

We cannot endorse Mr. Charles S. Peirce's objection to the doctrine of necessity, but we side with him when he denounces the mechanical philosophy for considering minds as "part of the physical world in such a sense that the laws of mechanics determine everything that happens." Mr. Peirce is right when he rebukes the mechanical philosopher for "entering consciousness under the head of sundries as a forgotten trifle." In some sense minds are parts of the physical, i. e. the natural, world, but they are not parts of that province of nature which constitutes the special domain of physics and mechanics. Ideas are not motions and cannot be explained by mechanical laws.

Having criticised in a former article of ours Mr. Peirce's position, and having rejected the indeterminism proposed by him, we shall discuss in the following pages the basis and scope of the idea of necessity.

The idea of necessity is based upon the conception of sameness, and we find that the existence of samenesses is a feature of the world in which we live. The existence of samenesses is a fact of experience, and upon the presence of this fact depends the possibility of the origin, the being, and the development of the thinking mind itself.

Necessity, as we understand it, must be carefully distinguished from the idea of fate. Although we accept without reserve the doctrine of determinism, we do not mean to deny the important part that chance plays in the world—not absolute chance, which according to Mr. Peirce is exempt from law, but that same chance of which the throw of a die is a typical instance. And bearing in mind that necessity is not a power outside of nature and above the will of man, but that it resides in them as the quality of sameness, we abandon the view that identifies necessity with compulsion; recognising thus, that freedom of the will is not incompatible with our view of necessitarianism.

I. THE BASIS OF NECESSITY.

The standpoint from which we shall treat this subject is that of monistic positivism,—the method which accepts no doctrine, theory, or law unless it be a formulation of facts. Facts are the bottom-rock to which we can and must dig down. At the same time, wherever facts appear contradictory to one another, we should not be satisfied, but continue to investigate until they are systematised so as to form a unitary entirety.

Before we begin our inquiry into the existence or non-existence of necessity, it is advisable to define the meaning of the term.

The Latin word *necesse* is most probably a compound of the negative *ne* and the supine *cessum* from *cedere* to yield, to move. "Necessary," according to this etymology, would mean that which does not yield but abides. Thus it is the inevitable; it is that which is or will be.

It is in this sense that the word is still used, or at least ought to be used, and in this sense we shall also use it.

Every word naturally acquires by a more or less appropriate application a series of meanings. So "necessary" means also that which is needful, that which is essential, that which is indispensable and requisite; it also means that which is done under compulsion. It is understood that we exclude all the other meanings of necessary except the original one, which is its properly philosophical meaning.

The idea of necessity is closely allied to the idea of sameness. In order to understand the former we must be clear concerning the meaning of the latter.

THE IDEA OF SAMENESS.

There exist a number of synonyms often used indiscriminately; they are: identity, sameness, equality, congruity, similarity, and likeness. By "identity" we generally understand a sameness in every respect, absolute sameness; by "equality", a sameness that can be expressed in figures. Equality is always a measurable sameness, and refers to quantity, mass, size, length, height, age, etc. Likeness and similitude are samenesses of form or of proportion, albeit not of size. It is often used as a partial sameness of impressions, not so much as they are in themselves, but as they appear to the mind. Congruity is a synonym of sameness in the province of geometry, denoting the coincidence of figures when laid upon one another.*

The logical principle of identity, so-called, it appears to me, ought to be named the principle of sameness, for it has not reference to the absolute sameness of a thing with itself.† The statement $A = A$ does not mean that this particular thing A is itself and that therefore the one A is one and the same thing. It is a general statement and means that all A, in so far as they are A, are the same. The statement $A = A$, as I take it, presupposes the exist-

* The adjective "like" is an abbreviation of "alike"; and "a-like" (M.E. *alyke*, A.S. *gelic*, O.H.G. *galih*, M.H.G. *gelich*, M.G. *gleich*) is a compound of the prefix *a* with *lic* body, shape, figure.

† I am satisfied that logical identity is intended to mean sameness. I suppose that the word identity, being Latin and a kind of international term, appeared to logicians preferable to the Saxon word "sameness" or the German "Gleichheit." We need not look for any deeper reason for the adoption of the term.

ence of a number of *A's*: otherwise it would have no sense, and it would not only be empty, as we know from Kant that all formal statements are, but meaningless and useless. It would be of no avail either in logic or in science.

In consideration of the fact that the idea of sameness is a fundamental concept in our scientific, logical, and philosophical reasoning, it is astonishing that no satisfactory definition of it is to be found. To define "same" as "one in substance; not other. . . . of one nature or general character, of one kind, degree, or amount," as is done in the "Century Dictionary," is no improvement upon "Webster," who defines it as "not different or other; identical. Of like kind, species, sort, dimensions or the like; not different in character or in the quality or qualities compared; . . . like." However, dictionaries are not encyclopædias; and they have perhaps a right to define same as identical, and identical as same.

Mr. James Ward, in the "Encyclopædia Britannica," (XVI, 81, in his excellent article on "Psychology," incidentally complains about the ambiguity of the word "same"; he proposes a distinction between "material identity" and "individual identity," but this does not solve the difficulty. Flemming's "Vocabulary of Philosophy" (4th ed. edited by Calderwood) contains several articles on "identical" and on "identity" without discussing in any one of them the meaning of "same" or of "identical."

What then is the meaning of same?

Let us first consider the etymology of the word. The root of "same" is found in almost all Indo-European languages; it is preserved in the first syllable of the Latin "similis" and "simul," in the second syllable of the German "Zu*samm*en"; in the Greek "ἅμα" and "ὅμοιος," and the Sanskrit "sama," all of which denote a togetherness. Thus the etymological meaning seems to signify what is classed in one category. Accordingly, the present meaning as defined by the dictionaries, as being that which is "of one nature or not different in character," has not changed; at any rate if there is any change, it is slight. Yet it is desirable to bring out and set in a clear light the purport of the word and its essence.

What, then, is the economic service and function of the idea of "sameness" in the household of thought?

"Sameness" is that feature in two things or states of things, in two processes or modes of action, which brings it to pass that the one may be replaced by the other without altering for a certain purpose the state of things or affecting the result of the entire process. Popularly expressed, sameness is the capability of one thing's being substituted for another.

There is no need of discussing or proving the truism, that, properly speaking, there is no absolute sameness, no identity in the strict sense of the term. This was the meaning of Heraclitus's idea of the perpetual flux of things, expressed in his *πάντα ῥεῖ*. There are no two moments in time, no two points in space, no two atoms of matter actually identical, and we cannot enter into the identical river twice.

Cratylus tried to outdo Heraclitus, by saying that we cannot even enter once into the identical river, for while entering, not only the river changes but also we ourselves; and Cratylus is perfectly right.

We have purposely substituted in Heraclitus's proposition "identical" for "same," because this change is needed to bring out the truth of the idea. Heraclitus and Cratylus cease to be right if we use the word same as above defined. We enter indeed the same river twice. The river of to-day is, for a certain purpose, quite the same as the river of yesterday, in so far namely as the river of to-day and the river of yesterday serve a certain and the same purpose: for other purposes this same river will perhaps not be the same. The geographer and historian speak of the Rhine as that stream of water which since time immemorial has flowed down from the St. Gotthardt to the North Sea. Accordingly, if we stand on the bank of the Rhine, it is quite correct to say that this is the same river that was crossed by Cæsar. Let the purpose of our thoughts be changed, and we shall no longer be permitted to speak of sameness. Suppose we had seen the Rhine for the first time in its beautiful emerald coloring, and had come again after a rainy day to admire its beauty, should we not be justified in exclaiming: This is not the same river!

Sameness, accordingly, depends upon a special purpose. If in a chemical combination a metal is wanted, it may be all the same whether we use iron, zinc, lead, or gold. That is to say, it is all the same for bringing about a special result; yet it is not all the same in other respects. The weight and certain other qualities of the metals are different, and also the cost.

SAMENESS AND MIND.

Sameness depending upon a special purpose, the question arises, Is there any objective sameness in the world, or is sameness a mere subjective addition to things? Is sameness something "real" or is it purely mental?

This is the old quarrel between the Nominalists and Realists among the Schoolmen. It lies at the bottom of the problem of universals and particulars, and we should say, it is only a special form of the question, "Are relations objective qualities of existence or are they products of the mind?" which was discussed in a former number (*The Monist*, II, 2, pp. 240–42). The idea of sameness represents the most important relation that exists; and if any relation is real, the relation of sameness must be real also.

If sameness depends upon a special purpose, it appears that there can be no sameness without that purpose; and the purpose being purely mental, the sameness also would seem to be purely mental. But this is not so. Sameness is an idea, and it is no exception to other ideas. All ideas are mental symbols formed for a special purpose; but, being symbols of something, ideas are representative of some reality, or of some feature of a reality, or of some relation between two or several things. Every idea stands for something; and this quality of the significance of ideas is called their meaning or their import.

The question now is, How does the idea of sameness originate in the world where, as we stated above, there is no absolute sameness, no identity? Our answer is that sameness, not identity, is a general feature of this world of reality, which impresses itself upon every mind from the very beginning of the mind's origin.

We can go farther in our statement and make it more emphatic:

Mind originates and grows only on the ground of the fact that sameness is a feature of the world, and is recognised as such by feeling substance.

Two points or two congruent geometrical figures being in different places are not identical. But they are of such a nature that, so far as regards the purposes of geometry, one serves the purposes in question just as well as the other, or one can be replaced by the other; and this quality is called their sameness.

Now as a matter of fact there are no two concrete things in the world in which there cannot be found some sameness. Both somehow affect sentiency; we say they consist of matter. Both can be measured in size, breadth, and height: we say, they are extended. Both are at any given moment in a certain relation to other things: we say, they are in space. Both have a definite form and consist of one or several special structures (i. e., so to say, inside-forms). All things can in some way or other be classed together under one heading. These samenesses of things go along with differences, and the degree of sameness in the different things varies greatly. Whether there is any sameness and difference at all in the world, cannot be decided *a priori*, but is a problem which can be solved only on the ground of, first, an *a posteriori* statement of the facts, second, a systematical arrangement of the facts. If this is accomplished we can venture into a methodical investigation as to the nature of the samenesses as well as the differences that obtain in the universe, and having arranged them in a system, we can apply *a priori* this system to facts with which we are not as yet acquainted.

The many samenesses which are experienced are not purely mental additions; they are not mere subjective imputations transferred upon objective existence. They are real; i. e. there are in the objective things actual features which allow of certain substitutions. A ray of light awakens in some feeling substance the traces left by former rays of light; and this reawakening is called memory. The perception of sameness is the beginning of mind, and it involves the perception of difference as a natural consequence.

Suppose that the stuff of which the world consists were capable of acquiring feeling, but there were no samenesses whatever;

which would mean that every smallest piece of the world-stuff were a particular thing by itself and in every respect unlike every other piece, of a different material or of no material at all, of different size or of no size at all, and also possessed of a different number of space dimensions. In such a world all the impacts made upon a sentient being would be different; not one would be like the other, and all feelings would present a chaos without uniformities, worse than the most complex many-pile. Under such circumstances mind would be impossible; it would neither originate nor could it develop.

On the other hand suppose again that the stuff of which the world consists were capable of acquiring feeling in some certain formation, and that there were samenesses in the world and in the events of the world. Would not mind necessarily originate in such a world? Given feeling substance in a world of samenesses and differences, these samenesses will produce analogous samenesses of impression upon the feeling substance, which will be perceived as samenesses of feeling. The preservation of the traces left in the feeling substance—supposing this substance to live on indefinitely—will in the long run result in the formation of special sense-organs. It will later on, with the aid of word-symbolism, lead to the formation of universals, for universals are nothing but samenesses perceived. It will then create with the assistance of abstract in the realm of scientific thought, representing the uniformities of the events of the world in exact formulas.

THE EXISTENCE OF SAMENESSES A FACT

The question whether there are samenesses at all in the world, is in our opinion settled. It is a fact that there are samenesses. The uniformities of the world are a matter of indubitable experience—indubitable because our very existence as thinking beings, as minds, is conditioned by this fact. We see the mind of every child develop out of his perception of samenesses. Our scientists teach us that the race-soul, like a great immortal individual, is the product of the accumulated experience of samenesses, and all future progress, in science as well as in civilisation, in mechanical invention

as well as in ethics, depends upon the trustworthiness of the samenesses stated to exist in the objective world.

The question of the ultimate *raison d'être* of the samenesses and differences, is another question ; and it would lead us too far here to discuss it. In several details the problem is not as yet ripe for solution. A full solution of the problem would be tantamount to the exposition of a complete knowledge of the world. Suffice it here to say that we have reasons to think of the world-stuff as being of the same nature throughout. The chemical elements seem to be different configurations of one and the same substance. In this way all difference would have to be explained as a difference of form.

The form of reality possesses sameness and difference in all its parts. Space in its sameness is by experience found to be tri-dimensional, which means, it is determinable throughout by three coördinates ; while its differences are due to the position of the points considered. For the purpose of the geometrician space is uniform, but for the purpose, say of the architect, it is not uniform. To the geometrician two congruent triangles, whether they are in the cellar or in the garret, are the same. However, to the architect the position of two congruent triangles in his design of a house is by no means the same. Every single point of space has its special and individual qualities.

The whole business of science is to systematise the samenesses of experience, and to present them in such convenient formulas that they can be used for guidance in our actions.

The most comprehensive formulation of the sameness of the universe as a whole has found its expression in the law of the conservation of matter and energy. This law rests upon the experience, corroborated by experiments, that causation is transformation. It states that the total amount of matter and the total amount of energy remain constant. There is no creation out of nothing and no conversion of something into nothing.

EINDEUTIG BESTIMMT.

After this sketch of the importance of sameness, (a subject which we have by no means exhausted,) we return to the idea of necessity.

The ideas of sameness and necessity are closely related. A world of sameness is a world in which necessity rules, and necessity means regularity and order.

German scientists have a very good expression to denote the formulation of events in a manner which describes them in their necessary course. If they have succeeded in finding the sameness in the instances of a certain class of events, they say that it is *eindeutig bestimmt*, which means, the sameness is determined in a way that admits of no equivocation; it is complete, representing solely and purely that feature upon the presence of which the result depends. Whatever is thus *eindeutig bestimmt*, is recognised in its necessity. The presence of that feature which makes it *eindeutig bestimmt*, determines the event to take place; and this being determined, its inevitableness, the *it will be* of the process, is all there is to necessity.

All natural phenomena that can be *eindeutig bestimmt* are necessary in their happening. A world which with regard to the total amount of its matter and energy is the same to-day and yesterday and will be the same to-morrow, a world whose laws of form possess a sameness throughout, so that it allows of formulating and applying them in their rigidity to all facts present, past, and future, a world in which all the changes are transformations determinable with the assistance of formal laws, can be relied upon and the course of its events can be computed.

Such *is* the world in which we live; and taking this ground I say, the world is a cosmos, it is no chaos; and noticing that being possessed of sameness is an intrinsic and inalienable feature of the world, I am inclined to add the world never was and never will be a chaos. And this, if it be true at all, is true not only in general and as it were wholesale, but in its minutest details. If there were deficiencies of this order in the unobservable details, they would not be diminished by being summed up in large and ever larger amounts; on the contrary, they would increase; they would grow in proportion. This not being the case, we have not the slightest reason to doubt that in those realms of minutest existence into which, from the grossness and the lack of precision of our organs and instru-

ments of observation, we cannot penetrate, the same order and regularity obtains as in those regions which lie open to our investigation. In other words: From this standpoint, existence is, so to say, permeated by law throughout; every event is determined and any kind of absolute chance is excluded.

Following Kant's etymology we understand by *a posteriori* the sensory elements, and by *a priori* the formal elements of our experience. The queer expression "a priori" is in so far justified as formal truths (such as geometrical, arithmetical, logical rules) are formulas expressing the universal samenesses of the form of existence. They contain the laws of form in a shape that is *eindeutig bestimmt*, so that an experimenter will know them *a priori* to be so. *A priori* means beforehand. An experimenter knows certain things even before he makes his experiments. The *a priori* elements of experience are by no means innate truths; nor are they the historical beginning of experience. On the contrary. In their abstract purity they appear as a very late product of man's mental evolution.

The *a priori* systems of thought are not arbitrary constructions; they are constructions raised out of the recognition of the formal, i. e. the relational, samenesses that appear in experience. All possibilities of a certain class of relations can be exhausted and formulated in theorems. As such they can be used as references to assist in the explanation and determination of new experiences. We know some part of any new experience with which we are confronted even before we have investigated it. We know certain laws of its form, and by reference to these known laws we are enabled to reduce the unknown to the known, to analyse the process and set forth that feature of it which makes it *eindeutig bestimmt*.

II. THE SCOPE OF NECESSITY.

Mr. Peirce objects to necessitarianism, and classes it together with materialism and the mechanical philosophy, speaking of the latter as the most logical form of necessitarianism. In consonance with the dictionary-definitions of these words, he contrasts them to the doctrine of the freedom of the will and also to miracles—the

latter, we must confess, being a dangerous concession to certain theological conceptions.

The "Century Dictionary" defines "necessitarianism" as

"The theory that the will is subject to the general mechanical law of cause and effect."

And "necessitarian" as

"One who maintains the doctrine of philosophical necessity, in opposition to that of the freedom of the will: opposed to libertarian."

The word "determinism" is regarded as a synonym of necessitarianism. Its first definition in the "Century Dictionary" reads as follows:

"A term invented by Sir William Hamilton to denote the doctrine of the necessitarian philosophers, who hold that man's actions are uniformly determined by motives acting upon his character, and that he has not the power to choose to act in one way so long as he prefers on the whole to act in another way."

Hamilton's definition as here presented is puzzling. If the words "choose" and "prefer on the whole" are *not* meant to be tautological, there is no sense in it; for no determinist denies that a man might "upon the whole" prefer to act this way, while he has the power to choose, and for special considerations perhaps does choose, to act in another way. However, if the words "choose" and "prefer on the whole" are meant to be tautological, the self-contradictoriness of the statement is too palpable for a Hamilton. Is there anybody who would maintain that a man who chooses to act in one way can at the same time, under the very same circumstances, and he remaining the very same man of the same character and intentions, choose to act in another way?

While we accept determinism and also necessitarianism in the sense that all events (the actions of willing beings included) are determined, we cannot accept either the mechanical philosophy or materialism as the terms are commonly understood.

We find materialism defined as

"The metaphysical doctrine that matter is the only substance, and that matter and its motions constitute the universe." ("Century Dictionary," 2d sense.)

The mechanical philosophy is explained *sub voce* "atomic" as

"[The view that] from the diverse combination and motions of . . . . atoms all things, including the soul, were supposed to arise." *Ibid.*

Determinism is simply the negation of absolute chance. It does not exclude chance in the original sense of the word as an unexpected event, as something that befalls one without his seeking it or making the event—chance being derived from ML. *cadentia*, i. e. the falling, as in a throw of dice.

The "Century Dictionary" defines "chance" in sense 9, as

"Fortuity; especially the absence of a cause necessitating an event."

This is absolute chance, the existence of which we deny. The "Century Dictionary" adds the following little note:

"Absolute chance, the (supposed) spontaneous occurrence of events undetermined by any general law or by any free volition. According to Aristotle, events may come about in three ways: first, by necessity or an external compulsion; second, by nature or the development of an inward germinal tendency; and third, by chance, without any determining cause or principle whatever, by lawless, sporadic originality."*

We understand chance as being, from certain premisses, an incalculable coincidence, either not intended to be calculated, or, for certain reasons, from a given standpoint with a limited and definite amount of knowledge, not capable of calculation. Determinism, as we understand the term, does not imply as the "Century Dictionary" has it in its definition of necessitarianism, that "the law of cause and effect" is "mechanical." It simply asserts that the law of cause and effect holds good universally, and that there is no effect that is not definitely determined, according to the nature of the things in action, by causes and all their circumstances.

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*Knowing that Mr. Peirce is one of the most prominent contributors to the *Century Dictionary*, I may be pardoned for surmising that, perhaps with the exception of the parenthesised word "(supposed)" he is the author of this passage and very likely of most of the other quotations of philosophical terms we have adduced from the same source.

NECESSITY AND CHANCE.

Mr. Peirce says:

"*All* the diversity and specificalness of events is attributable to chance—diversification, specificalness, and irregularity of things, I suppose is chance—and this diversity cannot be due to laws that are immutable." (P. 332.)

Our world-view leads us to other conclusions; we say:

Every specificalness or particularity is such by possessing a certain form and standing in a definite relation (in time as well as space) to all other things of the universe. Of every concrete thing we can say it is now and here, or it was then and there. It is or was made up in this special way, and it stands or it stood in these special relations to its surroundings. Proportions, relations, forms —these are what account for the diversification and specificalness of all things in the universe; they are what explain the irregularities of individual cases and of all those events which appear as chance to him who, although he may be well informed about the nature of a thing, does not know the relation of its complex surroundings, exercising according to law their disturbing influence upon its actions which otherwise would be uniform.

And since no two spots of space and no two instances of time are the same, since the relations of every atom are different in every position and at every moment of its existence, we need not be astonished to find diversity and specificalness in this world of samenesses.

We do not believe in absolute chance, but we believe in chance.

What is chance?

Chance is any event not especially intended, either not calculated, or, with a given and limited stock of knowledge, incalculable.

Gunpowder was, according to the legend, invented by chance. Berthold Schwartz intended to make gold, yet when the mixture was ignited, he began to understand that it was an explosive. When I say that I met a friend by chance, I mean that the meeting was unintentional. I had not foreseen it and perhaps could not foresee it. When we call a throw of dice pure chance, we mean that the incidents which condition the turning up of these or those

special faces of the dice have not been or cannot be calculated. We do not mean that the law of cause and effect is suspended; we mean that we are unable to determine the effect. That which would make this or that throw *eindeutig bestimmt* is either not known to us, or, if it were known, is of such a nature that we cannot produce the desired effect with any certainty. Matters are so arranged in the game of dice that the slightest incident changes the result, and these incidents are either not within our ken or not within the range of our power. Chance, accordingly, as we understand it, is no exception to necessity; it does not happen contrary to law, and is in each case the strict result of a definite cause under definite circumstances.

Absolute chance is something quite different. Absolute chance is that which is incalculable because of the absence of law. Mr. Peirce says:

"Another argument, or convenient commonplace, is that absolute chance is *inconceivable*. This word has eight current significations. The 'Century Dictionary' enumerates six. Those who talk like this will hardly be persuaded to say in what sense they mean that chance is inconceivable."

Absolute chance is "inconceivable" as the word is defined by the "Century Dictionary" in the second sense: It is

"unacceptable to the mind because involving a violation of laws believed to be well established by positive evidence."

Absolute chance is not unthinkable in the sense of unimaginable. We can very well depict a case of absolute chance in our imagination, just as we can tell and describe in minutest details the fairy tale of Alladin's lamp; just as we can in our imagination depict a creation out of nothing. But he who accepts that the world is in its innermost nature a cosmos, that its events are strictly and throughout regulated by law, cannot at the same time think that there are nooks and crevices in which the law does not operate. Absolute chance actually involves the idea of a creation out of nothing; and thus it stands in contradiction to the law of the preservation of matter and energy. Absolute chance which means that the very same thing under the very same conditions can act in this or in some other way, that it need not act in exactly the same way, involves a

belief in either the creation of a not existing quality out of nothing, or the disappearance of existing qualities into nothing.

Mr. Peirce says:

"It seems to me that every throw of sixes with a pair of dice is a manifest instance of chance."

Yes, of chance; but not of that chance the existence of which Mr. Peirce maintains—not of absolute chance. Every throw of dice, every toss of head or tail, are exactly determined by circumstances. We call it chance only in so far as we cannot calculate and predetermine the result.

Suppose you take two large silver coins between your thumb and the first two fingers, one coin parallel to and a little above the other. Suppose tails are up in both. Drop the lower coin without an effort just as it would fall, about twenty inches, and you may be sure that, in spite of yourself, it will turn up head. Then drop the upper one and it will not turn, but plump right down showing tail. There are certain mechanical reasons for the one case as well as for the other. As soon as we know the law and can apply it, the case ceases to be an instance of chance.

Dice, the roulette, and other games of chance are so arranged, that the determinating circumstances are too numerous and also too complex, one interfering with and being disturbed by the others, to admit of any adequate calculation or predetermination. An arrangement of conditions which in this way eludes the calculation of a definite set of possibilities, is called by Professor Kries *gleiche Spielräume* or equal chances. And the province of equal chances is and will remain the proper sphere of the calculus of probabilities.

Professor Nitsche objects to Kries's proposition, saying that absolutely equal chances are impossible and an equal chance (*ein gleicher Spielraum*) is nothing but the objectification of a judgment of equal value.* We find no fault with Nitsche's objection; there are no absolutely equal chances; and what is called "equal chance"

* *Die Principien der Wahrscheinlichkeitsrechnung* by Johannes von Kries. See also Meinong's review of the book (in *Gött. gel Anz.*, No. 2, p. 56 et seqq.) and Ad. Nitsche's article on the subject (in *Vierteljahrsschrift für wiss. Phil.* of 1892. XVI, 1, p. 26).

means that the strength of two or several anticipations is of the same degree; that our belief and doubt as to the turning up of one, two, three, four, five, or six spots of a die are equally justified. The objective conditions which justify such equality of several expectations is what Kries (if we understand him correctly) calls *gleiche Spielräume*. But *gleiche Spielräume* do not imply absolute chance. We might as well expect that all the six faces of a die should turn up simultaneously in one throw, as that any one of them should turn up by absolute chance.

While absolute chance cannot be admitted, partly because we are not in need of it, (since the irregularities of nature can be sufficiently explained otherwise,) and partly because the idea of absolute chance if it were needed, is incompatible with our world-conception, we shall, nevertheless, have to concede to chance, as we understand the term, a very important rôle in the evolution of life. The formation of worlds and the history of mankind depend to a great extent upon chances similar to the throws of dice. There are many possibilities, and now this, now that, will, according to the circumstances, be realised—of course in each case with strict necessity.

Let us illustrate this idea by an example.

The formation of about seventy elements out of the original world-substance, which may be supposed to be homogeneous, does not appear to depend upon chance. Their universal appearance in all parts of the universe suggests the hypothesis that their formation is the inevitable result of a gradual condensation of nebular substances. We find everywhere, according to the stage of condensation, a gradual appearance, first of the lighter, then of the heavier elements. There seems to be no possibility of the formation of other elements than those known to us (including here the hypothetical elements which are still missing in the Mendeljeff series and at the same time, at least, not excluding a further continuance of the series). These elements or none, it appears, must be formed out of the original substance of our world. Let us here assume, for argument's sake, that it were so beyond question, and that we knew the nature of the world-substance to be such as to condense, if it condenses at all, into no other but these forms, which we call chemical elements.

This would be a limitation of possibilities. Exactly so the throws of dice are limited. With the dice commonly in use we cannot throw fractions ; nor can we throw either zero, or seven, or any other higher number. We can throw only whole numbers, integrals from one up to six. But while we thus assume that the formation of the elements is limited to those actually existing, the proportion in which the elements may be distributed in the different nebulæ and solar systems, is apparently very different. Suppose we had a full knowledge of the intrinsic nature of the world-substance and were standing outside the universe observing the process of world-formations ; we could not from this knowledge alone predict all that would happen. We should on our assumption be able to predict *a priori* that such elements would be formed. But whether the different elements would be generated in these or in other proportions appears to depend upon the presence of certain conditions, perhaps the rapidity of motion, the heat produced by friction, the temperature of the surrounding cosmic space, any knowledge of which is not included in our knowledge of the nature of the world-substance. These conditions may vary, nay, so far as we can judge they actually do vary ; and any apparently slight variation of them, or even one of them, will result in different effects of great consequence. Without a detailed knowledge of all these special conditions, simply from a supposed *a priori* knowledge of the world-substance, the idiosyncracy of this or that particular solar system could not be *a priori* determined. Here it will be such, and there, under perhaps slightly different circumstances, it will be entirely other. Here the centre of gravity may be in one great mass, there again it may be divided in two, so that the planets circle around two suns.

From this point of view we have to call these results products of chance.

To a being who not only might be supposed to know the intrinsic nature of existence, but could have present before his mind every event of the great interacting cosmos in its entire complexity, this kind of chance would, of course, also disappear. To him all states of things would appear throughout as *eindeutig bestimmt*. Yet, although in this way necessity permeates all events that take place, we do not

intend to deny the irregularity of detail,* the specificalness of the particulars, the diversity of individual incidents and existences. According to our conception of nature they must remain, and we need not attribute them to absolute chance. To attribute irregularities to absolute chance (as Mr. Peirce does) is actually an abandonment of explaining them. The specificalness and particularity of nature can be said to be due to chance in so far only as they do not depend upon and are not determinable by the nature of the things under consideration, but result (with strict necessity of course) from the ever-changing conformations of surrounding circumstances.

Thus the fate of a man depends mainly upon his character,—the proverb says, "Every man is the architect of his own fortune"—but not entirely. There are sometimes coincidences determining the fates of men, and through them the fates of whole nations. And these coincidences do not result from their character.

Let everybody think of his own fate. Part of his life has been what it was because he is such a man as he is; and we can, within certain limits, predict the fate of a youth with whose character we are familiar. But how much of our lives depends upon circumstances which could be foreseen only by an omniscient being, and which, as we might properly say, if we do not misunderstand the term, is due to chance!

FREE WILL.

Compulsion is generally considered as a synonym of necessity. But the usage of the term necessity in the sense of compulsion is, in our opinion, very inappropriate, because misleading. Necessity and compulsion should not be confounded; for compulsion excludes free will and "necessity" does not.

A government compels its citizens to obey certain unpopular laws; the victorious army compels the enemy to surrender. The obedience of the citizens and the surrender of the enemy are acts

* By irregularity of detail we understand simply a lack of uniformity, but not exceptions to law. If irregularity be defined as exception to law, we should say, There is no irregularity in the world, while at the same time nothing is uniform: for every particle of the world is in its time and space relations and otherwise different from every other particle.

done under compulsion ; they are not acts of free will. But a man of a certain character wills, under given circumstances and in the absence of compulsion, *necessarily* in the way in which he does. The determination of a free will is not a matter of chance but of necessity. Yet the determining factors are not outside but inside ; they are not due to compulsion, not to the pressure of a foreign power, but to the nature of the willing being himself.

This, then, is the definition of "free": A being is free if it is unrestrained, so that it acts according to its own nature. As is its nature, so it wills ; as it wills, so it acts. If we know the character of a man and the situation in which he is placed, we can predict his choice as the necessary result of his nature. His decision, although it is free and not under compulsion, is not an outcome of chance which might under the same conditions be different, but is the inevitable result of necessity.

If by free will we had to understand that the decisions of the will are the result either of chance or of absolute chance, the foremost duty of the educator would be to make man unfree, to insert certain dominant ideas into his mind, destined to determine his will. The free man according to this definition of free will as being due to chance, would be a person whose actions are more whimsical than the fancies of lunatics. We reject this conception of the freedom of the will.

In our opinion a will is free if it is unrestrained so that it can act according to its nature. Our conception of free will does not stand in contradiction to the doctrine of "determinism" as defined by the "Century Dictionary" in its second sense :

"In general, the doctrine that whatever is or happens is entirely determined by antecedent causes."

THE MECHANICAL PHILOSOPHY.

We distinguish between (1) mechanical, (2) physical, (3) chemical, (4) physiological, and (5) psychical events.

A mechanical phenomenon is a change of place which does not involve a change of the constitution of the parts moved. E. g., a stone is pushed ; its position is altered, but the stone remains the same.

A physical phenomenon is an event in which the molecular state of the bodies in action is altered. Water heated becomes steam, frozen it becomes ice. The three states have different molecular configurations.

Chemical phenomena are such in which the constitution of the atoms is altered. The characteristic qualities of hydrogen, for example, are different when combined with different elements or when isolated. Each combination is a peculiar substance with peculiar qualities and not a mixture or combination of the qualities of the isolated elements.

Physiological processes are all those changes that take place in the living irritable substance of plants and animals, such as nutrition, growth, and propagation. Its characteristic features are (1) hunger or thirst, i. e. the want of certain materials (food), (2) the reception of the wanted materials by suction or other means, which in some cases are a quite mechanical or physical process, not unlike the afflux of oxygen caused by a burning candle or the suction of water by a sponge, and (3) the assimilation of food. The materials received are distributed in the places wanted, thus adding to the building up of the living substance according to the nature of its structure. This produces as a natural result (4) the phenomenon of growth with a preservation of form. (5) Propagation is a special kind of growth; it is the growth of a part that at some stage of its development becomes an independent individual.

Psychical phenomena are such in which feelings and the meanings of feelings are the determinant factors.

It is apparent that all these terms, mechanical, physical, chemical, physiological, and psychical, are mere abstracts. In describing a mechanical phenomenon, we limit our attention to the mechanical change. We do not mean to say that the body moved does not possess chemical, physical, perhaps physiological, or even psychical qualities. The calculation of the curve of a jump is a mechanical problem, although the jumping body may be a human being. However, the question why did the man jump, is a psychical question. The motive of the jump is an idea in that class of mental activity characterised as purpose. The man had an end in view. And this

idea of an end to be realised is the combined result of special conditions and of the character of the man.

The different spheres of mechanical, physical, chemical, physiological, and psychical actions being abstractions, it is obvious that science when dealing with so-called purely mechanical phenomena, has to do with a fiction. There are no purely mechanical phenomena. There are features of reality which are purely mechanical; and these we call motions. But the world does not consist of motions only. It also possesses other qualities.

The mechanical philosopher assumes that the world consists of matter and motion only, and so he feels warranted in the hope that every event that takes place, the actions of man included, can be explained by the laws of motion. Yet the premiss is wrong, and we may anticipate that the conclusion also will prove erroneous. And so it is.

The laws of motion are applicable to and will explain all motions; but they are not applicable to that which is not motion.

It is inconceivable how we can hope to explain a feeling by the laws of motion; and so the fond hope of explaining the problems of the nature of the soul by mechanics is preposterous. No objection can be made to the possibility of explaining the delicate motions in the nervous substance of the brain by the laws of molar or molecular mechanics. But these explanations would throw no light upon the causation that takes place in the mind. The properly psychical phenomena, the properly intelligent action of thought, could not be explained in this way. For the world of mentality introduces quite a new factor into the sphere of being.

What is this new factor?

The nature of mental activity consists in the symbolism of feelings. Feelings, being different under different conditions and the same under same conditions, become representative of their corresponding causes, and thus the objects of experience are depicted in feeling symbols.

Representativeness, accordingly, is the nature of mind.

The question, How certain brain-structures operate, is a question of the mechanics of nervous substance, and further, the

question, How thought-operations take place, is a question, so to say, of logical mechanics. But the question, Why a certain idea responds to certain stimuli and not to others, does not admit of a mechanical explanation or formulation. The answer to this question will be a description of the nature of the idea; and the nature of the idea is not a motion: it is the meaning of which the idea is possessed.

The action of a mind depends upon the meaning of certain symbols. A written or spoken word has a special meaning, and this meaning becomes the determinant factor of mind action. The meaning of a word is not a piece of matter, neither is it a motion. It is something *sui generis*. I do not say that there is any inexplicable mystery connected with it. On the contrary, wonderful as the fact is, it is not mysterious; it does not stand in contradiction to any other fact of nature. Symbols stand for something; they indicate, denote, or signify something. This significance is called their meaning; and mind is a system of symbols in states of awareness.

Now, neither states of awareness are mechanical, nor is the meaning of words anything mechanical. How can we hope for a mechanical explanation either of the soul or the mind or of any mental action?

Suppose, for instance, a general receives a message containing a few words. He opens the paper, he reads it, and all on a sudden, his mind is in a tumult of excitement. What is it that produces the excitement? Is it any motion? Yes! In a certain sense, it is a motion: it is the reading of the paper. This is the cause. Yet not the reading as such excites his consternation. He might read other messages all the day long without any such an effect. Plainly, the causative element of the cause is not the reading, not the motions of which the reading consists, not the shape of the written characters and their combinations in groups, called words. It is something more subtle even than that. It is the significance of the writing. It is the meaning of the written characters. It is the purport that is attached to the word-symbols.

The origin of mind accordingly introduces a factor which has nothing to do with mechanics; and the simplest psychical reflexes,

including those physiological reflexes which we must suppose to have originated by conscious adaptation and then been submerged into unconsciousness, cannot be explained from mechanical or physical laws alone.

SPONTANEITY.

While we thus reject the conception of the mechanical philosophy and also of materialism, we do not say that there are motions either in the brain or anywhere else which form exceptions to the laws of mechanics. The laws of mechanics hold good for all motions. The laws of mechanics are formal laws: they do not explain why bodies gravitate; but they describe how they gravitate; and the latter is much more useful to know than the former. There is (as we conceive it) no deep secret in the problem why bodies gravitate; they gravitate because they possess a quality which attracts them to each other with a force directly as their masses and inversely as the squares of their distances. In a word, gravity is the intrinsic nature of masses, it is an inalienable part of their existence. Thus whenever bodies gravitate, we are confronted with an act of spontaneity.

Attempts have been made to explain gravitation without the assumption of spontaneity, by the pressure of an atom-surrounding ether. But that only defers the question; for the spontaneity, in that case, would have to be placed in the ether. Whatever be the merits of the explanations of gravitation by a *vis a tergo*, we must recognise the fact that no motion can take place in the world, no pressure can be exercised, without there being somewhere some spontaneous something that moves or presses. Spontaneity is a universal feature of nature.

Mr. Peirce uses the term "spontaneity" in a different sense from ours. He identifies spontaneity with absolute chance. He means by it the irregularities that arise without cause, thus producing departures from law. We call that action spontaneous which is not due to external influence but springs from the nature of the things in action.

Spontaneous is derived from the Latin *spons*, "will," which as a noun was obsolete at the classical period of Roman literature and

occurred only in such forms as *sponte*, "of one's own will, of one's own accord." If a man acts of his own will, free from and not biassed by the influence of other men, his action is spontaneous. A free man's action is not arbitrary, unless arbitrariness* be the character of the man; it is not an exception to law; it is, if the character of the man is known, calculable in advance, for every free action is spontaneous: it springs immediately from the character of the man; it is the direct expression of his will; it reveals the nature of his very being, thus showing the man himself, and not something beyond or outside of him.

Taking the word spontaneity in this sense, we say: Masses gravitate spontaneously; they are self-moving; their motion is due to their gravity, and gravity is their intrinsic nature.

Exactly as the laws of mechanics explain the "how" of motions but not why there is motion at all, the "why" depending upon the nature of each moving body, so the "how" of the brain-motions is explicable by mechanical laws, but the "why" depends upon the nature of the moving material. The brain-atoms are possessed of the same spontaneity as the atoms of a gravitating stone. Yet there is present an additional feature; there are present states of awareness, and these states of awareness possess meaning, both of which are items which the chemist cannot find by chemical analysis. Neither states of awareness nor their meanings can be weighed on any scales, be they ever so delicate, nor are they determinable in foot-pounds.

Yet while mechanics is not applicable to mental facts, the realm of mentality is by no means to be surrendered to indeterminism. Mr. Peirce describes the domain of mind as the absence of law and the prevalence of absolute chance, of an indetermined and indeterminable sporting. This is not so. While the fact must be recognised that the nature of the mind is not something mechanical, its action is nevertheless determined by laws—not by mechanical laws,

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* Arbitrary, as used here, means capricious, uncertain, unreasonable. A man's action is capricious if he is biassed by the present motive alone, without considering other motives which he would have under other circumstances. A deliberate man equalises, as it were, his actions by forming rules of conduct. An arbitrary man does not recognise rules or laws, made either by himself or by others.

but by psychical and mental laws. These psychical and mental laws are in one respect of exactly the same nature as mechanical laws; they describe the samenesses of certain facts of reality. And the facts of the ideal domain of thought, the facts of subjectivity, are no less real than the grosser facts of mechanical motion, which are the facts of objectivity.

The term mechanical is often used in the sense of "lacking life or spirit" ("Century Dictionary," p. 3679). This is justifiable in so far only as when we speak of mechanical phenomena we do not mean psychical or any other phenomena. It is true that that which makes this or that idea respond to a certain stimulus is not a mechanical but a mental quality, but the action itself, in so far as it is a motion, is and remains mechanical. Thus it happens that the laws of mechanics, far from being anti-spiritual, are the means by which we learn to understand and objectively to represent the action of mental phenomena.

In this connection attention may be called to the efforts of modern logicians to construct thinking machines which will perform the work of mental operations in a purely mechanical way. You propose the problem by adjusting certain indicators; then you turn the crank, and the machine does the rest. The results will come out with unfailing exactness.

The attempt made to construct thinking machines cannot as yet be called successful. Nevertheless they are not impossibilities. Calculating machines of various constructions are in practical use and doing satisfactory work, not only in addition and subtraction but also in multiplication and division, and even in extracting roots and in raising numbers to higher powers. Calculations are undoubtedly one kind of thought, and if calculations can be performed by machines, there is no theoretical reason why we should not be able to construct logical machines, which shall perform the operations of deductive and even of inductive thought with perfect accuracy.

CONCLUSION.

Determinism does not make freedom impossible and natural laws do not suppress the spontaneity of nature.

Natural laws are not a power forcing a certain mode of action upon things; they are not an oppression of nature. Natural laws are simply a description of nature as nature is. There is no "must" in nature in the sense of compulsion, as if there were two things, (1) a master (i. e. the law) giving a command, and (2) a slave (i. e. the single facts) obeying the command. The situation is not dualistic, but monistic. There is an "is" in nature, and this "is" is constant. There is a certain sameness in nature. In spite of all changes it remains the same; and thus even the apparent irregularities preserve throughout an unvarying consistency. The facts of nature express the character of nature; they are nature herself. Briefly, the "is" of nature (if we are permitted to personify her) does not describe that which nature must do, but that which nature wills to do; it describes how she acts spontaneously, of her own free will, in conformity with her innermost being and consistently with her permanent character.

The main difference that obtains between the actions of inanimate nature so-called and rational beings is not the absence and presence of spontaneity, (for spontaneity is in both,) but the absence and presence of mind: and mind is not only the subjectivity of existence; mind is not merely sentiency, i. e. the awareness of feelings; mind is the representative symbolism of subjectivity.

There are sufficient reasons to assume that all objective existence, which appears to us as matter in motion, possesses a subjectivity, the nature of which depends upon the mode of the interaction of its elements. This subjectivity appears in organised substance as feeling and develops naturally into mind.

The essence of nature, accordingly, is not materiality, but spirituality. Materiality is the character of nature as it affects sentient beings; but its innermost self, as it were, its subjectivity, its psychical aspect is revealed in the appearance of the spirit-life of rational beings—of minds.

While we fully recognise the spirituality of nature as nature's innermost essence and as an ineradicable feature of reality, we cannot with Mr. Peirce place mind at the beginning of the world. There is a great difference between spirituality and mind. One is the source and condition of the other. One is permanent, the other is transient. One is the abstract view of a universal quality of the world, eternal and everlasting, as much indestructible as matter and energy; the other is an individual formation that originates, grows, and develops; that can be broken and built again; that dies with the body and rises again in new generations; that decays, as the foliage of the trees falls in winter, yet reappears, as the verdure reappears in spring; for the life of nature is immortal.

Mr. Peirce, regarding determinism as that view which does not recognise the freedom of will, has an original and in our conception a wrong view on the one hand of natural laws, which are to him mere habits acquired by the world, and on the other hand of chance, or arbitrary sportiveness, (i. e. that which is not determinable by law,) which he identifies with mind and with the spontaneity of freedom. Mind is to him the beginning of all. Mind remains mind, according to his view, so long as it is irregular, producing out of its own undetermined being sporadic effects without order or consistency. As soon as mind takes to habits, it grows mechanical; by creating regularity it disappears; and the result is matter in motion according to mechanical laws. Matter, accordingly, is said to be "effete mind." Law in our view is the divinity of nature; according to Mr. Peirce it is the termination of nature's irregularities: it comes to suppress her freedom and to supplant her mentality by mechanicalism. An element of pure chance, however, survives, which appears in the free will of man, in miracles, and in nature's irregularities, and this element of pure chance will remain until in the infinitely distant future, mind becomes crystallised into an absolutely perfect, rational, and symmetrical system. Such is in brief Mr. Peirce's view of the rôle played by mind in the world-process.

Mr. Peirce's views of chance and law seem to come to the rescue of certain theological dogmas, which represent the world-order as the product of a divine mind. We doubt very much whether

Mr. Peirce's position be tenable even from the standpoint of the scientific theologian. For the order of the world, as it appears in natural laws, must be, and is recognised even by the theist, as part and parcel of God's eternal being. The scientist who formulates *sub specie aeternitatis* certain facts of nature, say the "how" of gravitating bodies, describes a certain quality of God himself; he describes something that is immutable, eternal, everlasting; it is not the whole of God, but it is certainly one feature of Jahveh, of that which is, was, and will be as it is.

In contradistinction to Mr. Peirce, we recognise, that the regularity of the whole is preserved in the specificalness of its individual particulars, that there are samenesses in this world of changes and diversities, and that if all reality is regarded as being essentially the same throughout, all the diversities and apparent irregularities can very well be explained as resulting from peculiar forms, combinations, and relations. Furthermore, we recognise that natural laws are compatible with the spontaneity of nature and that the necessity with which a free man acts according to his character, does not reverse his freedom of will.

Nature is self-acting throughout; nature is free; even inanimate nature is spontaneous. But a higher freedom rises with the appearance of mind. And there are degrees of this higher freedom which can be determined with great exactness, for they correspond to the range of the mentality of each creature. Mentality develops by the observation of samenesses, and it reaches rationality by the recognition of natural laws. The recognition of natural laws is a view of some natural phenomena in their eternal aspect, and we call them truths. So much is natural law and freedom interconnected that the recognition of natural laws widens the range of freedom; and obedience to them raises man out of his dependence upon his surroundings to a state of dominion over the creation in which he becomes the master of natural forces.

What a deep significance lies in the saying of the apostle: "The truth shall make you free!"

EDITOR.

LITERARY CORRESPONDENCE

I.

RECENT EVOLUTIONARY STUDIES IN GERMANY.

SINCE Darwin's death, his theory, which in Germany more than elsewhere received its development, has but few decisive steps in advance to point to, even though the circle of its adherents has been enlarged and though in many respects and in special directions it has been rendered more complete and placed upon a firmer foundation. It is a gratifying fact, that most, if not all, of the recent discoveries in zoology, palæontology, and particularly in developmental history, are easily and completely reconcilable with the principles originally established; so that the views which we have reached on this subject have lost more and more the characters of a purely hypothetical fabric.

But the accurate investigations of developmental history have unquestionably furnished the most important material in proof of the theory in question, and the principles established in this department, in the main the results of the labors of German investigators (E. von Baer, Fritz Müller, E. Haeckel), have been verified in a truly surprising manner.

It is true that Darwin himself in no way undervalued the importance of the results of the studies in question, but how little the facts known at the time of the enunciation of his theory of natural selection sufficed, is most clearly proved by the fact that E. von Baer and Louis Agassiz, who at that time were perhaps the greatest authorities in embryology, assumed a hostile attitude towards the

new Darwinian theory. Agassiz's combination of the points of agreement of palæontology and embryology, his explanation of extinct forms as "prophetic types," proved a veritable hindrance to the perception of the truth, and Carl Vogt, who was his co-worker at that time, appears to have been the last to set up any opposition to the "fundamental biogenetic principle," that the development of the individual repeats in an abbreviated form the history of his race. Vogt, formerly the champion of advanced views, appears to-day as the leader of the small band of the opposition.

If we compare the recently published fourth edition of Haeckel's *Anthropogeny*, 1891, and the eighth edition of his *History of Creation*, with the early editions, we cannot help remarking, with considerable astonishment, despite the enormous increase of fresh material, the fact that little in the old plans and principles of the work needs correction. Even the bold generalisations, the inference as to the identity of form of the original beginnings of all of the middle or higher classes of animals, the "Gastræa Theory" of Haeckel, at first so violently opposed, the stress laid upon the equivalence of the blastoderms in the various orders of animals, nay, even many of the animal genealogies, really only asserted as a working hypothesis, have stood the test beyond all expectation; although Du Bois-Reymond insinuated that the pedigrees of the heroes of Homer were more worthy of credit. To appreciate the complete victory of these ideas one need but refer to the discourse *On Recapitulation in Embryology* with which A. Milnes Marshall opened the meeting of the Biological Section of the British Natural History Society at Leeds, September, 1890.

The very conspicuous irregularities in the formation of organised bodies, which formerly were regarded as monstrosities, or as the freaks and riddles of the formative instinct, the hare-lips, the cleft palates, cases of microcephaly, etc., or the conspicuous want of symmetry in the physical structure of the plaice and sole, formerly made use of by Mivart and Schimper as unassailable counterproofs of Darwin's doctrines, have shaped themselves into the most decisive verifications of his theory; as in fact, generally, a number of the most splendid evidences of the correctness of the theory have, as the

result of exact investigations in organic evolution, proceeded from the most obstinate of its supposed difficulties. Thus, for example, as proof that birds are far removed from the other classes of vertebrates, the circumstance had been cited that certain parts connected with the visual organs are in them situated at the side of the brain, instead of on the dorsal surface, as is the case with the other vertebrates. But a more exact observation has shown that this variation in formation is a secondary result, since in each previous period of development these same organs in the young birds lie, exactly as in the case of the other vertebrates, on the dorsal surface, and only shortly before leaving the egg do they move downward to the sides. In many cases where the development of parts preservable in fossil conditions is under consideration, as for instance portions of the skeleton, the hard integuments, and the teeth, a direct proof may, by comparison, be furnished of the truth of the fact of the correspondence of the embryological formations of living animals with the final and permanent forms of their extinct representatives, a fact which was indeed acknowledged by Agassiz and Vogt, but completely misunderstood. We need only to recall to mind the exact parallelism which Alexander Agassiz and Neumayer have demonstrated to exist in the case of echinoderms, Huxley, Marsh, and others in the formation of the wings of birds, the pelvis of birds, or the hoofs of horses, in order to stamp this view as one that cannot be refuted.

Nevertheless, those opposed to this view, as Carl Vogt, His, Heufen, and others, have not abandoned their position as a hopeless one, and in recent years have relied particularly upon those cases which Haeckel, and before him, Fritz Müller, characterised as a falsification (cenogenesis*) or a supplementary alteration and abbreviation of the natural process of development. "Nature is no falsifier," these opponents proclaim with emphasis, and everything it does is correct and true, and "this false heart alone brings untruth and deceit into the true heaven," they cry with Wallenstein. People

* *Cenogenesis*, from κενός, empty, fruitless (and γένεσις, birth); not from κοινός, common, the derivatives of which are sometimes written "ceno."—Ed.

who rely on verbal sophistries merely betray thereby their want of valid counter-arguments. A *mala fides* on the part of nature can of course never be the subject of discussion among reasonable beings, but a deviation in the process of development of certain varieties from the typical path of the development of the remaining varieties of the species, is *felt* as a falsification by every investigator who has thoroughly studied the regular processes, for the reason that it has a tendency to *obscure* the original facts. Thus, for example, in the embryos of certain vertebrates the æsophagus is temporarily completely closed, as Balfour has observed in young sharks, Bles and Marshall in frogs; and this state of affairs may well be considered as a falsification, since an animate being with a closed æsophagus is a natural contradiction, which can never have existed and here happens as a supplementary and temporary process.

As a rule such deviations from the normal course may be classified as consequences of a prolonged residence of the animal germs in the egg or in the womb, the result of which is that owing to the presence of an abundant quantity of nourishing yolk, or through direct connection with the circulatory system of the mother, they in the early stages of their development are relieved of the necessity of acquiring nourishment through their own efforts, and therefore all the contrivances necessary to that purpose may be dispensed with. For this reason we find the primitive processes of development, as Professor Sollas has lately shown, most frequently preserved in marine animals which have never changed nor abandoned their element in the course of the history of their species, in the case of which, therefore, no occasion could ever have arisen for supplementary changes in the process of their development. Much more frequently do we meet with this change in the case of fresh-water animals, for often the rapid currents of their elements, for example a river, will not suffer these to leave the egg in any very helpless larval condition, and in addition fresh water is subject to other unfavorable changes, as the drying up of streams. Also the larvæ of carnivorous animals, which from the very beginning of independent life need more strength to acquire their means of existence, are so completely developed in the richly provisioned eggs in which they

take their form, that they emerge therefrom in an almost perfected state of being, as, for example, young sharks and cephalopods. In this kind of animal life, as well as in the case of forms which are brought forth alive from the parent, although they see the light of day much later, comparatively, there takes place not only a great abbreviation of the first stages of existence in the entering upon a more direct path of development, but also changes occur in the form of the original designs because of the limitation of room due to the presence of yolk in the egg, the reason for which is easy to perceive. In many other cases the mechanical cause of the change in development can be directly recognised ; for example, in the case of the tree-toad of the Antilles (*Hylodes martinensis*), which, owing to the absence of pools lasting through the dry season, is obliged of necessity to remain in the egg during its tadpole stage, that is to say, to skip this stage, as it were ; for which reason the formation of external gills in its case is entirely omitted.

The explanation of the origin of new organs seemed at first to afford an insuperable difficulty to the Darwinian theory, since, as Mivart objected, it was not possible to perceive how natural selection could be able to effect the formation of new organs unless they executed corresponding functions from the very beginning. This difficulty, however, has been completely overcome by the theory of altered functions (*Functionswechsel*) which was first proposed by Dorhn, and particularly in recent years by Kleinenberg. According to this theory, in all these cases we have simply to deal with a gradual change in form of already existing organs, which, originally being used to perform one set of functions, are modified so as to perform another. Thus the later developed organs of mastication and the feelers of insects were originally organs of locomotion, legs ; and these in the still earlier stages of creeping motion performed appropriate functions as the crooked appendages of the body-rings. The wings of birds were, in their progenitors, forelegs ; the tongue of air-breathing vertebrates originated from the fish-bladder, which before that was chiefly an organ of swimming.

The knowledge thus acquired of the natural connection of the processes of evolution also explains, according to Kleinenberg, why

organs which are at present completely useless, must yet necessarily appear in the formation of the embryo ; for example, the gill-openings in the higher classes of vertebrates, which have no functions to perform at any stage of vertebral development, and which furnished Meckel the first intimation of the fundamental biogenetic law. But as soon as it was explained that the gill-openings furnished the foundation of the development of later-appearing organs with actual functions to perform, it was rendered clear why they should continually recur ; namely, because they form the indispensable links of a chain which extends from the dim past of the type in question down to the present time.

There is no doubt that profounder researches in evolutionary history will furnish still more important results : for instance, the more perfect elucidation of the pedigree of mammals ; for in this province even our domestic animals are not sufficiently investigated. Every new effort in this direction, for example the recent work of Klever on the evolution of the teeth of the horse, and other investigations concerning the formation of special organs, has invariably shown that much in this field yet remains to be discovered. We have only to recall to mind the recent investigations relating to the development of the pineal gland, which in the last decennium have also led to the discovery of a rudimentary occipital eye, which seems to have actually existed and performed functions in numerous early representatives of the vertebrates, but to-day is simply a fact of history, and has given rise to an organ which Descartes considered as the seat of the soul. We may here also refer to the recent investigations concerning the earlier developmental stages of the duckbills, which have completely confirmed what the theory asserted in advance and required ; namely, that they fill the vacancy between the egg-laying reptiles and the mammalia which bring forth their young alive.

Only a few years ago Carl Vogt vehemently opposed the opinion of the duckbills being transitional types, and sought to explain their inferior stage of organisation, which is also evidenced in their low blood temperature, as the results of a stunting process (degeneration, so called). They formed a degenerated branch of mar-

supials, nothing more. Later, the remarkable yet long anticipated fact was revealed by Haacke and Caldwell, 1884, that the duckbills are egg-laying mammals, a character which certainly could not have been acquired through degeneration, but which simply shows that they are closely related to extinct reptilian forms. In one other respect, namely, with regard to their supply of teeth, the process of degeneration must indeed be admitted. On this point, Poulton and Thomas discovered a few years ago that in their early stages they really do possess true teeth, which, however, just as in the case of certain carnivorous cetacea, later completely disappear, and are replaced by a sort of horny teeth. This, however, is really not a true degeneration, but rather a special adaptation, doubtless beneficial to the animal in some way or other: and with as little reason as we may regard birds as a degenerated race in comparison with their progenitors, because they have lost the numerous teeth which these possessed, with just as little reason can we hold that the duckbills, in their general organisation, have suffered any retrogression worth mentioning. On the contrary, the recent investigations of Marsh and Lemoine concerning the mammals of the Jurassic and Cretaceous periods point more and more distinctly to the conclusion, that there existed among these mammals a very large number which possessed the same degree of organisation as the duckbills of today, now represented by only a few species: a supposition which the adherents of the theory of evolution made twenty-five years ago. I do not know that the pedigrees of the heroes of Homer have been so well preserved!

In many other directions, however, speculation of late years in Germany has considerably digressed from the facts of experience and from all probability; especially with reference to the questions of propagation, variation, and heredity. Here, first of all, are to be mentioned the works of Weismann, *Ueber die Continuität des Keimplasmas* 1885, *Die Bedeutung der sexuellen Fortpflanzung für die Selectionstheorie* 1886, *Der Rückschritt in der Natur* 1886, *Die Bedeutung der Richtungskörperchen für die Vererbungstheorie* 1887, *Die Hypothese der Vererbung von Verletzungen* 1889, and *Ueber Amphimixis* 1891.

If we revert to the beginnings of this movement we shall find that it is intimately connected with the more exact study of the processes of fecundation as perfected through the researches of Strassburger, the Hertwigs, and other investigators. In connection with the ideas of Nägeli concerning the so-called idioplasm, the notion was reached that the matter determinative of heredity was contained in the nucleoli, and that by the union of the paternal and maternal nucleoli the sum-total of the parental hereditary tendencies is transmitted to the offspring. This view was to a certain degree verified by the experiments of the brothers Hertwig in removing the nucleoli of the eggs of the sea-urchin; the result being that eggs containing the nucleoli alone, furnished, through artificial impregnation, results resembling the female parent, whereas eggs from which the nucleoli had been removed, furnished germs completely corresponding to the traits of the male parent.

Other processes of fecundation, to which we shall soon recur, had since 1876 produced the impression in the minds of a number of naturalists that the germ-material led an independent life in the bodies of organisms, that it possessed only an internal development, and required from the body nothing but nourishment in order to multiply itself, and to develop its internal powers uninfluenced by the various vicissitudes of the body. In the year 1876 Gustav Jaeger in Germany, and Francis Galton, a cousin of Darwin, almost at the same time in England, called attention to the observation made some time previously, that in certain animals, particularly in insects, the development of the egg into the young offspring begins with the withdrawal of a small portion of the germ from the component substance of the embryo, which remains at first unchanged and only later multiplies. This observation was generalised and accepted. At the commencement of every sexual multiplication the germ-substance, after impregnation, is divided into two parts, according to its future purpose; an ontogenetic or personal part, out of which the body is built up, and a phylogenetic or germinal part, which at first is stored up unused in the individual, but later furnishes new germ-cells. This idea led Weismann to his view of the continuity of the germ-plasm, which forms an unbroken line

of descent from the first beginnings of the species and which is simply nourished by the organisms in which it has its temporary abode. From this germ-plasm spring *secondarily* the cells that go to make up the body (soma); but from these soma-cells no new *germ*-cells can originate, and consequently none of its inherent or adscititious qualities are capable of transmission. The somatic cells make up the mortal and perishable forms of life, while the germ-cells alone insure the further existence and immortality of the race.

It is easy to perceive that these views, if they could be maintained, would completely transform the Darwinian theory. Since, if the somatic cells, that is, the body-parts of animals and plants, with all their adaptations to soil and climate, to definite modes of life, etc., are to be deprived of every power to transmit hereditary characters, then the so-called Lamarckian theory, which should really bear the name of Erasmus Darwin, would be deprived of every foundation which it possesses. Neither the increase in strength of the members of the body, acquired by use and practice, nor their weakness created by their non-use could be inherited; and in just as small a degree could changes caused by external influences, bodily injuries, sickness, entail consequences which were inheritable. This being the case, then also all those views would be untenable which seek to explain the important effects of time as the result of the accumulation and augmentation of the minute impressions of the external environment. If the variations which are generated by means of external influences are not capable of transmission, then the direct adaptation must commence at the beginning in the case of every following generation; an accumulation is impossible.

We can observe, however, in every particular case, the complete harmony in which every living being exists with its surroundings and mode of life; and observe in closely related species the most various adaptations to the elements in which they live: climate, food, nay, even to the particular companions with which they associate; with the result that many plants have shaped the structure of their flowers to conform to the physical anatomy of the insect which ordinarily effects their fertilisation, and that animals assume the figure and form of some associate who is safe from hostile assaults, or even

completely adopt different modes of life where it is necessary to enter a life-partnership with a strange animal or plant. But, granting that the most widely extended capability of adaptation is a thing of daily experience, there still arises the question how we shall explain this quality, which can only be brought about by slow degrees, without taking into account the factor of heredity in the transmission of acquired qualities. The theory of Weismann attempts this, in that it takes for granted an infinite variability in the germ-formative materials, and guides the new forms and variations thus begotten into the really true path, that is, into the most successful paths, through the process of natural selection (that is, through the survival of the fittest as regards environment, and all other things). According to this doctrine, external circumstances have no direct influence whatever upon the variation of species, as Erasmus Darwin, Lamarck, and the founder of the theory of natural selection and all his followers up to that time supposed, but we have to have recourse to a pure theory of natural selection, and call to our aid an, even now, rather obscure phenomenon, occurring in connection with sexual impregnation, which has been called "the expulsion of the polar bodies," an extrusion of minute qualities of germ-plasm from the germ-cells while in union. By the processes of crossing, which continually recur, a vast number of the most manifold hereditary tendencies are united in the germ-material. Then certain of these are ejected, so that others acquire supremacy; and in this manner the way is opened for the origination of a vast number of possible combinations. In this way the path is clear to a theory of perfect mechanical variability, in which the germ-material has only to transmit the characters which spontaneously arise in it, and yet affords an investigator endowed with any imagination the possibility of understanding the origin of the great variety and final purpose of the world. It is Frohschammer's "principle of the imagination as the creator of the world" translated into comprehensible formulæ. The simplicity thus reached by the elimination of all direct influences from the external world, has won the adherency of many investigators following in Darwin's steps, particularly in England; but whilst Wallace, Galton, Ray Lankester, and others have

expressed their full assent to it, other and not less eminent athorities, as Herbert Spencer, Haeckel, Fritz Müller, and Virchow, have emphatically rejected it.

The reasons in favor of this assumption are, as is indeed the whole view itself, mainly of a theoretical nature: the arguments of the opposition are divided into philosophical and experiential propositions. The philosophical opposition is mainly based on the fact that, from the very beginning, there is assigned to the germ-material, as it unceasingly continues its existence, an infinite variety of capacities which the external world cannot affect, and that all progress and advancement takes place as the result of the *loss* of the originally endowed powers and tendencies. On this theory a family of acrobats or race-horses would not acquire their powers through the gradual augmentation by practice of their feats of skill and endurance, but because these powers were originally resident in them, and every factor incompatible with them was gradually eliminated. On the other hand, these views approach in a dangerous degree to the theories of predestination and preformation, the overthrow of which has been justly regarded as one of the greatest advances of science.

Still more important must be considered the objections of empirical science, which up to this time was completely convinced of the heredity of acquired qualities. Popular experience, as well as that of physicians, universally speaks of inherited disease-germs, and in certain cases, particularly in mental diseases, physicians are so thoroughly convinced of their inheritability that the first question put to the relatives of such sufferers usually is whether the disease has ever appeared in the parents or family of the patient. This fact is so deeply grounded in the general belief, that the modern naturalistic school of novelists, the school of Zola, Ibsen, and their associates, are wont to devote their main efforts to the problem of inherited evils. Now the inheritability of certain evil conditions, even though proved, would not by any means be an absolute disproof of Weismann's theory; for, inclined as much as we may be to derive diseases from mistakes and sins against a natural mode of life, such as colds, drunkenness, dissipation, mental and bodily

over-exertion, we yet cannot deny *a priori* that blastogenic diseases, or diseases originating in the germ-plasm, may exist, which without any doubt would then be transmissible. It also does not lie beyond the realms of possibility that congenital malformations, such as hare-lips, supernumerary fingers, and the defects which show a remarkable disposition to heredity, fall into this category. These blastogenic germs of disease would then, of course, have to be distinguished from the somatogenic diseases (or the diseases produced in the body by external causes), which never could be inherited.

From this point of view the question as to the hereditary consequences of external injuries has given rise to great efforts to prove experimentally the truth of this belief, which has existed for centuries. In almost every part of the globe we meet with the assertion that hornless cattle, such, for example, as are bred in South America, or the tailless cats of the Isle of Man, or other domestic animals with similar deficiencies, are descended from a progenitor which lost its horns or its tail through disease or other mishap. Since now, recently, similar assertions have again been put forward to the effect that tailless cats are found among the descendants of feline progenitors who have been robbed of their posterior ornaments by an act of violence, and these cases have been discussed in connection with the pangenesis theory of Darwin, according to which each part of the body is believed to supply material contributions to the germ-plasm, Weismann determined to institute experiments on this point. He started the breeding of white mice whose tails were regularly cut off, without finding as a result, from among 840 young ones derived from such mutilated progenitors, a single one having a malformation or missing tail. However, even this experiment cannot be regarded as an absolute proof, as it at first view might seem, and the negative result was foreseen by the writer of these lines. It is a clear conclusion that if in the case of many vertebrates, for example, salamanders and lizards, as well as in the case of most invertebrates, missing limbs and tails are renewed in the course of their lifetime, it would indeed be very remarkable if their renewal should not take place, at least in the case of the complete rejuvenation of new birth.

Darwin himself had concluded, from his own experience and that of others, that injuries and similar inflicted acts of violence are the cause of hereditary consequences only in cases where they bring about some long-continued and wasting disease, and thus produce some permanent effect on the bodily constitution. For this reason, especially injuries to main nerve-tracts in parts near the centres are readily accompanied by hereditary consequences, because they interfere with the nutrition of the members supplied by them. Brown-Séquard has observed in a great number of cases of guinea pigs whose nerve-roots he had severed, that the offspring of the animals operated upon developed diseases of the eyes, ears, and other organs which conformed regularly to the character of the operation, and could therefore be predicted; and also noted malformations and deficiences, amounting even to the complete disappearance of the eye-balls, such as never arise or have been observed in these animals without violent interference. His positive results regarding the hereditability of the evil consequences of disturbing operations have a decided advantage in numbers and scope over the negative results of Weismann; and it is not clear how the belief in the non-hereditability of somatic conditions will accommodate itself to them.

But if conditions of the body produced by such sudden interferences have under certain circumstances entailed hereditary consequences, how much more should we expect this same result from slowly effected constitutional changes, which external influences, working uninterruptedly for hundreds of years, bring about in an organism which has been transported into a new element, into new surroundings, or into a different climate. Not at all infrequently does the coming together and union of two new organisms beget hereditary changes which can be explained only through the direct influence of the one upon the other. Thus, for example, in the case of plants in hot countries which are protected against the assaults of leaf-devouring ants by body-guards of smaller ants, and also in species of quite different families, as, for example, in *Cecropia* of the order *Euphorbiaceæ*, and in some *Triplaris* species among the *Polygonaceæ*, we find little chambers, approachable through

small openings in the stems, which serve the ants protecting the plants as dwelling and breeding places. Are we to believe now, in regard to this fact, that these plants, so different in their nature, have produced through voluntary variations the stems which contain these openings, or are we to believe we have to deal here with openings acquired through inheritance which originally were bored in the stems by the ants at the most appropriate points? Surely the first conclusion, which would uphold Weismann's theory, has but a very slight degree of probability in its favor, whilst the latter, which would overthrow his view, is very highly probable. And such examples could be cited in great numbers.

It is also to be remembered that the power of variation is not exhibited solely in sexually created individuals, as it should be according to Weismann's theory, but frequently also in non-sexual multiplication, where no amphimixis (mingling) occurs. It is well known that the majority of the sporting varieties of our trees, for example, *Fagus sanguinea*, and the so-called weeping varieties, that is, abnormal varieties with pendent twigs, forms with split, spotted, or white leaves, are wont first to appear on single branches of old trees, in which the continuity of the protoplasm unquestionably existed, but no amphimixis or extrusion of the polar bodies took place. It is also the generally received opinion of naturalists that the lowest classes of animal and plant life are universally multiplied by non-sexual means. And if this is so, it is not clear how higher forms which sexually propagate can be derived from them, if the latter have originally to furnish the fundamental conditions of variation. The adherents of Neo-Darwinism will, accordingly, have to furnish many additional facts if they wish to invest their theory with any degree of probability.

CARUS STERNE.

II.

FRANCE.

The study of personality, from the point of view of pathological psychology, has already supplied us with numerous books. M. ALFRED BINET, in his fine work, *Les Alterations de la Personnalité*, has undertaken to present systematically to us these alterations in their entirety, while restricting himself to ascertained results, and avoiding disputed points. He exhibits to us the "dismemberment of the ego" in diseased states, the frequent rupture of that "unity of consciousness" which is the principal attribute of the normal individual.

Clinical observation has established the existence in certain subjects of successive personalities, and in others that of co-existing personalities; the experiences of suggestion have at last allowed of analogous morbid phenomena being provoked, in such a manner that cases may be varied and rendered still more instructive. The simple movements provoked in normal persons in states of distraction, of which many very curious examples may be found in M. Binet's book, are the recognised mark of a subconsciousness; but it is often possible, under the same conditions and with the same processes, to provoke in a hypnotisable hysteric individual an actual sub-personality, that is to say, to augment the phenomena which attentive observers have long since remarked in everyday life.

It cannot be doubted that, on the one hand, it is possible to produce in an insensible limb a great variety of subconscious actions, and all sorts of reactions; and when they are recorded by the graphic method, it is perceived that with the fingers of his insensible hand, the subject has made movements the form of which varies according to the receiving apparatus (the dynamograph, drum, pencil, etc.). These movements thus exhibit the truly psychological marks of adaptation, and seem to reveal the existence of an intelligence which is other than that of the ego of the subject, and which acts without his assistance and even unknown to him.

On the other hand, numerous experiences of very different kinds show that the subject whose anæsthetic arm, for example, is pricked, can have an idea of the stimulation, although he does not perceive it. He does not feel the prickings, but the excitation calls forth the idea of their number: he counts them as a normal individual would do; "only, in hysterical individuals, the first part of the process occurs in one consciousness, and the second in another." *

It can hardly be denied that these different consciousnesses are distinct; since experience proves that each can have its own perceptions, its own memory, and even a moral character. However, their relative value with respect to each other matters little. We are compelled to consider, with M. Ribot, the ego as a "coördination" of states of consciousness, admitting of infinitely variable groupings. According to the old conception of the ego, the personality, with respect to secondary consciousnesses, was compared to a coachman who had ceased to have control over his horses. This comparison is now insufficient, since it may happen that the coachman falls asleep on the box, and that one of the horses then governs the set, regulating, more or less perfectly, the pace of the others by its own gait. Spiritualists, however, will never consent to put the ego in the place of the coachman. "A stone detached from the complex structure of the personality," M. Binet now tells us, "can become the starting point of a new structure, which rises rapidly by the side of the old. Whereupon a disaggregation of the psychological elements is produced." This comparison is certainly more precise and more in accordance with facts.

Moreover, there remains to be explained how the mental compound which constitutes the ego has been constructed from its elements. M. Binet shows, *à propos* of this question, that the association of ideas is powerless to explain the genesis of personality; associations alone, as proved by the experiences of suggestion, are not sufficient to restore forgotten memories. Neither is memory the sole factor in personality; since, in certain conditions a person

* The hypothesis of the division of consciousness explains, consequently, much better than that of the motive force of mental images, the facts of automatic writing (spiritism). [The works of Binet, Roberty, and Lombroso are published by Alcan.]

may, while preserving the consciousness and the memory of certain of his mental states, nevertheless repudiate these mental states and consider them as foreign to himself.

This question is still an open one. But there exist certainly some grounds for our seeking in the division of consciousness the key to certain psychological facts, like unconscious cerebration. Such a key would be the action of detached consciousnesses and detached memories, that afterwards immediately enter the current of general consciousness. Finally, "it is possible," as M. Binet says in conclusion, "that consciousness may be the privilege of certain of our psychic acts; it is possible also that it exists everywhere in our organism, and it may be even that it accompanies every manifestation of life."

* * *

In his new work, *Agnosticisme*, M. DE ROBERTY studies with special care the position of modern doctrines with regard to the unknown, the great *x* of philosophic speculations—God, Idea, Matter, Noumenon or Unknowable. Although perhaps a little hastily written, and somewhat obscure, his book nevertheless enforces conviction. "Our conception of the world," says M. de Roberty, "embraces solely the things that we *know* (feel, perceive, imagine, analyse, compare, etc.), and does not comprise the least jot or tittle of what we *do not know*. *For us*, therefore, there can be no question of any relations except between two classes of *known* elements: that which constitutes the object of scientific research, and that which is outside of science. The latter class represents *our* unknown, which is always *relative and purely human*." Here, indeed, we have the true point of view, that which we shall all reach, though perhaps at first unknown to ourselves; and I shall be much surprised if the philosophers do not at last decide to wipe out the formidable *Unknowable* set up by Spencer as the ultimate entity. We shall speak no more of the fathomless universe, but of the still unexplored universe; of the unknown, not of the unknowable.

There is, however, another aspect of the question. Let us suppose the unknown got rid of; or to be more precise,—and if we regard with M. de Roberty the psychic centres as special receivers in

which the cosmical energy empties itself, resolving itself into sensation and idea, and from whence it spreads itself anew as motion, —let us suppose that we have summed up all the energies received and emitted, and verified the law which reduces memory to the conservation of energy; let us suppose in fine that philosophy shall have found in the ego the synthesis of the non-ego, expressed "in symbolic abbreviations and in signs," and shall have realised the "logical monism" which reduces things to their ideas: would the intellect—and would the sensibility—even then be completely satisfied? Can we conceive a state in which the curiosity of man as to all that concerns himself will be at rest, and when he will cease to be disquieted about the cause of suffering and of life? Kant long ago propounded this question. But, according to M. de Roberty, the thinker who is "a prey to the afflux of emotion referred to by Kant," the man "given over to the desire for another kind of knowledge than that of experience," are, in the category of intellectual emotions, diseased and "perverted" persons. "The sentiments, so varied in aspect and in strength, which inspire us," writes he, "the contemplation of the unknown, determine the mental illusion which materialises, so to say, our ignorance and transforms the unknown into the unknowable."

Would it be inconsistent, however, to preserve the emotion of the unknown without "materialising" it, without pronouncing any dangerous scientific *ignorabimus?* M. de Roberty does not accept this situation,—which was that of Littré. I do not know whether any one will discover the "vaccine," as he calls it, "of the pessimist emotion which has produced agnosticism or latent religiosity." If this constitutes a mental malady, I fear much that it will be incurable. As long as there is unhappiness in life, there will also be unsatisfied curiosity, and for a very long time to come, inquietude.

* * *

The last publication of LOMBROSO and LASCHI, *Le Crime politique et les Revolutions, par rapport au droit, á l'anthropologie criminelle et á la science du gouvernement* (Political Crime and Revolutions, in their Relation to Law, Criminal Anthropology, and the Science of Government) of which we here have a French translation, is, I

will not say, the worst written, but the most confused work imaginable. Its arrangement is clear, but its examples are given without any order whatever. The facts presented are abundant, but they are taken rather too much at haphazard, and often too uncritically. The worst is that its very thesis is weak, badly formulated or elusive in places. What a pity it is that so much erudition should be expended, and so many valuable data be brought together without better success in displaying to the best advantage these riches, and also, let me say, without so many times having had occasion to appear so clearly in the wrong! M. Lombroso remains unmoved, unfortunately, in his high sounding and unqualified hypothesis of "diseased genius." He continues to develop it and to defend it in this latest book of his, which is replete with instructive details, and which is undoubtedly the first considerable attempt at an etiology of revolutions and of political crime.

The complex doctrine of Lombroso could be sufficiently summed up, if I am not mistaken, by uniting word to word—by the mathematical sign of equality—philoneism (or the love of novelties) with the revolutionary spirit, the revolutionary spirit with genius, genius with insanity, insanity with criminality, and criminality, finally, with progress. But what a detestable thing progress would then be! We should have to protect ourselves against it as we do against a pestilence. The evolution of societies does not take place without great waste and loss, as we all know. It should be carefully shown what these losses are. The study of the conditions of social progress ought to be made in greater detail than is here found. The terms of the imagined equation, which here hovers before our eyes, should in fine, if any comparison is to be effected between them, be subjected to a much more exact quantitative and qualitative analysis.

For example, let us take genius. Of what kinds of genius does Lombroso speak? It seems to be sufficient for him that a man has attracted attention, and made himself talked about, to entitle him to be called great, while perhaps he is only a blusterer, a braggart, a servile imitator, a mere *homunculus*. In this way the quantity of geniuses and talented individuals he has unearthed is something extraordinary. The result of this is a radical error in his tables of

the distribution of geniuses. The superiority that he attributes, in this respect, to certain of our southern departments, as compared with the Norman departments, for example, would have to be reversed if we considered the relative quality and kind of the genius involved. For the same reason, the relation established between genius and republican modes of government is undoubtedly not so precise and simple as is stated. But the worst of it is that in thus augmenting the number of men of genius, it is found that we have, in consequence of the above mentioned equation, also increased the number of the demented and the degenerate!

If, moreover, it is true that the conservative mind, with less genius, insanity, and criminality, is evidence of the senility of the race, how can we accept the thesis that genius and the spirit of innovation are also absolute evidence of a neurasthenic condition? Shall we deny sound nerves to robust and vigorous youth? This, indeed, is not what Lombroso wished to assert. Yet the famous thesis always confronts us: *Latet anguis in herba.* The least sign of degeneracy is enough for him to brand a man, and not only are all geniuses in his eyes unbalanced, but even the insane are without any ado baptised geniuses; with the result that all is heaped together in one great mass—genius, insanity, and spirit of revolution.

I shall not dwell any longer on these criticisms. They are simply intended as an admonition to the learned M. Lombroso against the allurements of a badly founded theory, and against the dangers arising from a too hasty preparation of his books. Whatever may be its defects, he has at least brought together in his present book many ideas. I advise all to read with care what he says about women (and how many will find him misoneistic on this point!), concerning their great influence in *rebellions*, which are always barren of results, and their impotence in *revolutions*, which are always productive of good. In the second part of his work, namely, in the section entitled *Juridical and Political Applications*, nearly all he says is to be commended. I agree with the authors—or I do not wish to forget M. Laschi—as to what they tell us in relation particularly to pettifogging parlementarianism and public instruction. Their conclusions are perhaps not connected with the

thesis in any very intimate manner. But this is not of much consequence, as they possess an independent value of their own.

* * *

In a previous communication I referred to the work of Savvas-Pacha on Musulman jurisprudence. I have now to announce a work entitled *Souvenirs du Monde musulman*, by M. CH. MISMER, (published by Hachette,) the fourth and last volume of a valuable series which is greatly deserving of attention. M. Mismer, who has lived a long time in the East—at Constantinople, in Crete, and in Egypt—and was acquainted with the leading personages of the Empire, does not hesitate to return here to the theory which he set forth more than twenty years ago in his *Soirées de Constantinople*, his theory, namely, of the social advantages, and even the superiority, of Islamism over Christianity; subject however to the special worth of the races which belong to either of these two forms of religion. This opinion is not lightly uttered, and it will appear the more striking in view of the present crisis of social and moral decomposition which is now spreading throughout the western nations.

In the work of M. Mismer will be found some of the great and striking qualities of the observing and thoughtful mind. In connection with a special problem of great importance in public instruction, that of heredity, I shall call to the attention of my readers the following statement, made with reference to the young men of the "Egyptian Mission" in France, directed by M. Mismer for ten years. "The capacity of a pupil," says he, "was always found to be intimately connected with the cerebral culture of his ancestors and the faculties constituting the superiorities of his race." "It was the same," adds he, "from the moral standpoint." Undoubtedly, if M. Mismer had taken the pains to make a note of the facts summed up in his statement, and to present the full case of the numerous pupils that he has had under his care, he would have been able to furnish science with data of the greatest value. Let us at least receive his lessons as he offers them to us. They are the fruit of the experience of a "man of action," and it speaks well for an observation that it has rendered good service in practice.

LUCIEN ARRÉAT.

CRITICISMS AND DISCUSSIONS.

COMTE AND TURGOT.

To the Editor of The Monist:

Your "note of inquiry" mentioned on p. 611 of the last *Monist* is answered in full by Littré in *Auguste Comte et la Philosophie Positive*, where Turgot's name heads the third chapter. He shows that the latter discovered the law of the three stages, theological, metaphysical, and positive, by the following quotation from his *Histoire des progrès de l'esprit humain.*

"While the connection between physical effects was yet unknown, nothing was more natural than to suppose that they were produced by intelligent beings, invisible and resembling ourselves; for what else could they have resembled? Everything that happened without the intervention of man, had its god, whose worship was soon established by fear or hope, and this worship was conceived in accordance with the deference accorded powerful men; for the gods were only more powerful men and more or less perfect according as they were the product of an age more or less enlightened as to the true perfections of humanity. When philosophers had recognised the absurdity of these fables, without however having obtained true light upon natural history, they imagined an explanation of the causes of phenomena by abstract expressions, such as essences and faculties: expressions that nevertheless explained nothing and that were reasoned about as if they had been beings, new divinities substituted for the old ones. These analogies were followed out, and faculties were multiplied to account for each effect. It was only very late, in observing the mechanical action that bodies have upon one another, that other hypotheses were drawn from this mechanics, (*de cette mécanique*) which mathematics could develop and experience verify."

Littré calls attention to "the great sureness of judgment" that led Turgot to cite only physical phenomena when he spoke of those that had ceased to be interpreted either theologically or metaphysically. "When he wrote this passage, positivity (I use this word, a necessary creation of M. Comte's) was only beginning to reach chemical phenomena and had not yet attained those of biology and sociology."

But, says Littré, "after reserving the rights of priority for this eminent thinker, there is nothing to prevent M. Comte from keeping all the part that he had made

himself and that belongs to him. Three principal points mark Comte's independence of Turgot. The latter saw in the conception nothing more than an idea to meditate upon; Comte saw in it a sociological law; Turgot did not attach to it a sketch of human development. Comte developed with the aid of this law the whole historical series; Turgot did not perceive that he held one of the necessary elements of a philosophy. Comte in the same flight of thought, went from history become science to philosophy become positive The sociological law, isolated in Turgot, makes part, in Comte, of a vast whole: there were therefore two independent creations. Either M. Comte had not read Turgot, or, more probably, he had read him at a time when this passage, which to-day awakens attention, had no particular significance."

The fourth chapter in Littré's Life of Comte has for heading the names of Kant and Condorcet. The whole of the former's remarkable sketch of general history is given and reference is made to the letter in chap. viii, where Comte, in 1824, being twenty-six years old, says to M. d Eichthal, his former pupil, "I have read and reread with infinite pleasure Kant's little treatise; it is prodigious for the epoch, and if I had known it six or seven years sooner it would have saved me trouble. I am delighted that you have translated it; it can contribute very efficaciously to preparing minds for positive philosophy. Its general conception or at least its method is still metaphysical, but the details show the positive spirit at every instant. I had always regarded Kant not only as a very strong head, but as the metaphysician that approaches the nearest to positive philosophy. But this reading has greatly fortified and especially given precision to my conviction in that regard. If Condorcet had had knowledge of this writing, which I do not believe, very little merit would remain to him, since he can pretend only to that of the conception, which is almost as firm and, in some respects, even clearer in Kant As for me, after this reading I can find in myself, up to the present time, no other value than that of having systematised and fixed the conception that had been sketched by Kant unknown to me, which I owe chiefly to a scientific education; and even the most positive and distinct step that I have taken after him, seems to me only the discovery of the law of the passage of human ideas through the three stages, theological, metaphysical, and scientific; a law that appears to me to be the foundation of the work whose execution Kant has counselled. I thank my lack of erudition to-day; for if my work, such as it is now, had been preceded by a study of Kant's treatise, it would have lost much of its value in my eyes I conceive now, as you said, that, for the German philosophers that are familiar with this treatise, my work will really have a great effect only with the second part." This work was a short one reprinted in Saint-Simon's *Catéchisme des industriels* and called "A System of Positive Politics." It had been inserted two years before, under the title of "A Plan of the Work Necessary for the Reorganisation of Society," in a pamphlet of Saint-Simon's, without Comte's name, and it was because the latter insisted, this time, upon an acknowledgment of his authorship that Saint-Simon broke with him The "second

part," which was to produce the great effect upon the German philosophers, never appeared; or rather, it soon grew to be the *Course of Positive Philosophy*, begun on the 2d of April, 1826, before Humboldt, Blainville, and other celebrated listeners.

The term *positive philosophy* had long been used by Saint-Simon and his school, Comte among the rest, not in the special sense that the latter now gave it, but as a "generic name for the whole of science." The first use of the words as we now understand them is in a letter from Comte to M. d'Eichthal, dated Aug. 5, 1824. "I cannot help recalling your judicious reflection upon the influence that social physics, once formed, will have upon scientific philosophy. I go even further than you, for I think that it will be only then that a veritable philosophy of the sciences can exist. All the philosophical ideas that are there to-day, although very precious up to that time, appear to me to have nothing more than a simply provisory (provisoire) character. I shall speak a little about this relation in the general preface that I announce to you, where I shall explain that the true title of my work would be *positive philosophy*, and that if I preferred *politics*, it is because that is the most urgent philosophical application and the one that is to found the science, but that later I or you or others will complete this system of ideas by the encyclopedic recoinage of all our positive cognitions (connaissances), which ought really to be conceived as a single mass, although, for good culture, it is indispensable to preserve and to push even, in one sense, further than it is, the division of labor, so that each special savant can always, subsequently, conceive the relation of his branch and even of his twig to the universal trunk."

In a letter of about this date Comte refers to his habit of never rewriting anything. His memory permitted him to look upon a volume as finished when it had been thought out and before a line had been written. But even in his letters we notice some of the disadvantages of this procedure, which, while conducive to unity, sacrifices literary form.

It is true that Comte studied under Saint-Simon; but, according to Littré, his purely philosophical dependence was very slight, while his influence upon his master was important. "What forms the distinguishing characteristic of Saint-Simon at the epoch when he lived, is the social destination that he assigns without hesitating to the ideas that preoccupy him. He has, as we have seen, only the most confused notion of what this philosophy will be; but, no matter what it is to be, he consecrates it in advance to the reorganisation of society."

As regards Condorcet, Comte enthusiastically acknowledges his indebtedness to the "Sketch of an Historical Table of the Progress of the Human Mind," and even goes beyond the facts, as he did in his praise of Kant.

Littré makes a fair division of credit among others as well as those already named, and concludes as follows: "Turgot had discovered that human conceptions, at first theological, afterwards become metaphysical and end by being positive. Kant had known that history is a natural phenomenon, subjected to a determinate course, and Condorcet, pushed harder than his predecessors by advancing time,"

(he had been condemned to death) "had attempted to trace a table that should put in evidence the enchainment of the progresses of civilisation. These are great things, but they are still only rudiments; for neither Turgot nor his successors make use of the discovered law to found upon this general fact evolution; Kant, who perceives clearly the necessity of conceiving history as regulated by the conditions inherent to humanity, is unable to base this important notion on anything better than an *à priori* idea" (the metaphysical principle that nature does nothing in vain, and that as human faculties do not reach their development in the individual, who is ephemeral, they must do so in the species, which is durable) "and thus he leaves it incapable of fixing the attention of a century whose tendencies were more and more positive; lastly Condorcet has no other guide than the negative philosophy of the eighteenth century in a work to which it could bring only contradiction."

John Stuart Mill says of Comte that "far from pretending to originality when he had really no right to do so, he was eager to attach his most original thoughts to every germ of a similar idea that he met with among his predecessors."

Speaking for himself, Littré says of the law of the three stages, "I do not reject it, I restrain it. As long as we remain in the scientific order and consider the conception of the world first theological, then metaphysical, finally positive, the law of the three stages has its full efficacy in directing the speculations of history . . . . But in history all is not comprised in the scientific order. M. Comte, who has said somewhere that it is necessary to suppose, at the beginning of humanity, certain notions that were neither theological nor metaphysical, has indicated the germ, I will not say of my objection, but of my restriction. In fact this law of the three stages comprehends neither industrial, nor moral, nor æsthetic development. It has however, the excellent character of being relative to the speculations in which evolution by filiation is most manifest and consequently of giving a positive notion of the march of history."

Is it true, as stated on p. 565 of *The Monist* for July, that Stuart Mill adopted Hume's "erroneous conception of causality" to the extent implied in the following passage? "This idea of 'sequence' however was exactly Hume's mistake, adopted by Mr. Mill, and through Mr. Mill popularised among English thinkers. If the nature of cause and effect were really constituted by invariable sequence, then the night might be called the effect of the day because night is invariably consequent upon day."

The only authority at hand on the island from which I write is Clemenceau's translation of Mill's "Auguste Comte and Positivism," where, on p. 61, I read as follows, "The succession of day and night is just as much an invariable succession as the alternate exposition of the earth's two opposite sides to the sun. Yet day and night are not the cause of each other; why? Because their succession, although invariable, according to our experience, is not so unconditionally: these phenomena succeed each other only upon the condition that the presence and the absence of the sun succeed each other; and if this alternation were to cease, day and night

would not follow each other. There are thus two kinds of uniformities of succession, one without conditions, the other dependent on the former: laws of causation, and other successions which depend on these laws."

In a note Mill refers to his *System of Deductive and Inductive Logic*.

LOUIS BELROSE, JR.

SOME REMARKS UPON PROFESSOR JAMES'S DISCUSSION OF ATTENTION.

In his recent treatise on psychology Professor James discusses in an interesting and suggestive way the relation of ideation to attention, maintaining that "ideational preparation . . . is concerned in all attentive acts." Attention is "anticipatory imagination" or "preperception" which prepares the mind for what it is to experience. Thus the schoolboy, listening for the clock to strike twelve, anticipates in imagination and is prepared to hear perfectly the very first sound of the striking.

It is undoubtedly true that in the form of attention we term expectant, where we are awaiting *some given impression*, there is a representing, antedating experience, which may be a preparatory preperception. But with a wrong imaging of what is to be experienced there is hindrance, as when in a dark quiet room we are led to expect sensation of light but actually receive sensation of sound. Very often, indeed, our anticipations make us unprepared for experience. Further, the experiments adduced by Professor James from Wundt and Helmholtz are in the single form of expectant attention, and we must remark that in these experiments the reagent is also experimenter, and this introduces a new attention, consciousness of consciousness, and that of a peculiar kind, which complicates an already complex consciousness. In general we may say that experimentally incited consciousness is artificial, at least as far as it feels itself as such, and for certain points like simple attention this tends to vitiate results. Self-experimentation or experiment on those conscious of it as such may mislead in certain cases, and must, so far as this element of consciousness of experiment is not allowed for. In physical science things always act naturally whether with observation or experiment, but in psychology observation, other things being equal, is more trustworthy than experiment.

In all cases of expectant or experimentally expectant attention, the attention does not, however, lie in the expectancy or in the imaging as such, but it is merely the will effort concerned in these operations. Yet as we may expect without effort, and preconceive without volition, attention is necessarily involved in neither. A perception or a preperception is an attention only as accomplished by will with effort, but only an unattention when purely involuntary. Professor James's use of attention as preperception brings us back to the common idea of attention, as any consciousness which cognises something. This is so inbred in thought and language that it is most difficult to avoid using the term in this sense. Many psychologists like Mr. James and Mr. Sully frequently mention attention as a will phenomenon

but they do not treat it under will, and they constantly return to the cognition meaning. Höffding, however, treats attention under psychology of will. Attention as the exercise of will in building up and maintaining cognitive activity, is naturally treated under cognition; but it is on the whole safer and better to discuss attention under will so as to keep it sharply distinguished from the presentation form which it vitalises. I have endeavored to hold the term strictly to this sense, yet it is not unlikely I may sometimes unwittingly countenance the common confusion, but trust the instances will be few.

When we have, then, a case of expectant attention we must distinguish the attention in the imaging from the attention in the actual cognising. It is, indeed, true for us almost invariably that cognitive strain without immediate realisation is incentive to ideating. In listening in the night in vain for a sound we hear in imagination many sounds, and we form preparatory ideas of what we are to hear. Sense-adjustments call up a train of sensations in ideal form. But it is obvious that low intelligences which have no power of expectancy or ideation do yet really attend. The very first cognitions and all early cognitions by their very newness and difficulty were attentions long before ideation was evolved. With low organisms, as cognitive power extends only to the present in time and space, immediacy of reaction is imperatively demanded, and every tension of cognitive apparatus is immediately directive of motor apparatus so that suitable motion is at once accomplished. The cognition, though dim and evanescent factor, is yet powerfully energised, and so a true attention. Always with lowest sentiencies, and often with higher, pain is suddenly realised without anticipation, followed quickly by attention as strong effort to cognise the nature and quality of the pain-giver and so to effectually get rid of pain-giver and pain.

Preliminary idea, then, cannot occur in early attentions and in late attentions it is by no means necessary. It is said that we see only what we look for, but it must be answered that seeing commonly happens without any looking for. The kindergarten child, Professor James to the contrary notwithstanding, is not confined in his seeing to merely those things which he has been told to see and whose names have been given him. A child continually asks, What is that? and is quick to discern the absolutely new and strange. He accomplishes a wide variety of attentions without ideas and gives himself almost entirely to immediate presentations.

To be sure, every one sees only what he is prepared to see, only what is made possible for him by his mental constitution as determined by his own pre-experience and the experience of his ancestors, but this does not signify ideation. Every cognising is conditioned by the past, but this does not call for a reawakening and projecting in ideal form at every instance of cognitive effort, before any real cognition is reached.

In fact, many, if not the most of our attentions, are merely intensifyings of some present cognition, of some cognitive psychosis which has simply come or happened. Take the instance of attention to marginal retinal images, this certainly

does not always imply pre-perception, the forming of an idea of what we are to see, though in the cases mentioned by Professor James it may. For example, I was writing the above seated with my profile to the window when I became suddenly aware, through the physiological agency of a marginal image, of a moving object to my right. This perception of bare undefined object was spontaneous, a pure given; I exercised no will in attaining it, and so the state of cognition was not an attention. However, by attending, by intensifying the cognition by will effort, I perceive that the indefinite object is a man walking on the sidewalk, who is of a certain height, clothed in a certain way, etc. I do not trace the least ideation in the whole process, the slight attending as act of will did not imply any anterior or posterior idea or representation. The reason for the will act was the intrinsic interest of movement, and this intrinsic interest arises in the fact that moving objects have had for all life a special pleasure-pain significance, the moving object is the most dangerous, and so motion perceived has become ingrained in mind as a special stimulant of attention. This habit of attentiveness to things in motion survives and continues for cases where it is of no use and even of harm; thus, in the present instance, it diverts me from my work. It is obvious that attention often occurs in the same way for other senses without preliminary idea.

On the whole we must conclude that attention is a much abused term, and it is to be hoped that psychologists will for the future keep to the definite and best use of the term; namely, to denote cognitive effort in all its degrees and modes.

HIRAM M. STANLEY.

IS MONISM ARBITRARY?

In Vol. II, No. 3, of *The Monist*, a very kind criticism appeared from the pen of Mr. Francis C. Russell of the doctrine of a double-faced unity of mind and matter. It was said that this doctrine is very far from inducing that final satisfaction which we rightly expect of a competent theory, and the critic propounded as a possible explanation of mental phenomena the postulate of a conservation of spirit. He calls spirit the elementary basis of consciousness considered as a quality. Spirit would be the subjectivity of nature, the elements of feeling, or as Professor Morgan calls it metakinesis; and consciousness would originate in the same way as electricity, i. e., by rending spirit asunder into positive and negative spirit so as to produce a tension. This would account for the appearance and disappearance of consciousness in that spiritual "dynamo" which is called the nervous system.

This proposition seems to be highly acceptable because it stands upon the principle of a conservation of substance and attempts to represent the phenomenon of consciousness as due to a transformation. But does it for that reason remove the difficulties of the doctrine of a double-faced unity of nature, which, as Mr. Russell says, "is open to the charge of being arbitrary and brings no access of insight"? Is not perhaps the term double-faced unity (which is none of my invention, and

which I have been careful to avoid) a misleading and unsatisfactory term? Why should nature be double-faced? Why are feeling and motion the only two attributes of natural phenomena? Is this not arbitrary? Could nature not be just as well a treble or quadruple-faced unity. Nature might possess, as Spinoza actually declares, infinite attributes of which these two only, viz. extension and thought, i. e. motion and feeling, happen to be known to us.

It is this apparent arbitrariness which bars our insight and deprives us of the satisfaction that ought to attend the real solution of a problem. But let us avoid the term double-faced unity; let us speak of the subjectivity and the objectivity of nature, and the clouds will disappear.

The doctrine of a double-faced unity has been criticised as dualism, and the proposition that nature consists of two radically different attributes—exactly of two, not more and not less—must most decidedly appear as dualism. But is it dualistic to say that every subject appears to its objects not as a subject but as an object among other objects? Certainly not.

The relativity of the terms subject and object affords us the key to a comprehension of the situation. This world of ours is a world of relations. The phenomena of nature exhibit an unceasing activity; they consist of constant changes, and every change, every motion, has a whence and a whither. Every transformation is a series of events among which any prior one is called cause and any subsequent one effect.

If we regard feeling and motion as two attributes of nature, we are actually on the brink of dualism, and we shall understand how Spinoza, in order to escape from dualism and arrive at a monistic view, assumed without any plausible argument the existence of an infinite number of attributes. This assumption however is of no avail, for the problem would arise: How is it that we know only two of all these infinite attributes? Why do we not know any other? and why are we unable to form even a dim notion of any other? If they exist why do they exhibit no effects upon us? Perhaps because we ourselves and this world of ours consist only of two! And if they exhibit no effects upon us and upon our world, can they be said to exist at all? Might we not, in that case, consider them as non-existent and count the two known attributes alone as actual realities? Thus the dualism would remain; and Spinoza's monism is only apparent.

The same objection cannot be made if we remain conscious of the fact that feelings are as much abstracts as motions. Subjectivity and objectivity are correlative terms. There is as little a duality in the idea, that subjects presuppose objects as that effects presuppose causes. There are not causes in the world which are nothing but causes, nor are there effects which are nothing but effects. Take for instance an historical event. Was Cæsar's death a cause or an effect? Plainly, this depends upon the view we take. As the sequence of the wounds which Cæsar received from his assassins it was an effect; as the beginning of the civil war consequent thereupon it was a cause. If I look at you, you are the object and I am

the subject. If you look at me, it is the reverse. Thus the relation of a certain thing to its surroundings makes of it a subject, while the surroundings are its objects.

Subject and object being correlatives, we can very well understand why there are no "subjects in themselves"; every subject is at the same time an object in the objective world. We can further understand, why every subjectivity except our own withdraws itself from direct observation. We can observe the movements of organisms like ourselves and judge by way of analogy that they feel pain or enjoy pleasure. We see their motions which betray certain feelings, but we can never see the feelings themselves; and even supposing that we could enter into the brain of a man and that the whole mechanism of brain-action were laid open to our inspection in its minutest details, we should see motions, combinations and separations, integrations and disintegrations, we should see the oxydation of the gray substance, which would appear as a great turmoil and excitement, but we should see (as Leibnitz says) no thoughts, no perceptions, no feelings. That it cannot be otherwise is obvious when we consider that our objects will always present to us the character of objectivity.

But suppose we were an atom of oxygen and entered into the process of brain-action as an active factor, our subjectivity would soon become absorbed and welded into a higher unity with the subjectivity of the other atoms. We should then, as a part of that brain's consciousness, feel these feelings, perceptions, and thoughts; we should, then, *be* the subject which we could not see and which we were searching for in vain in the world of objectivity.

This conception of the correlation of subjectivity and objectivity does not only convincingly explain the unity of feeling and motion, it does not only establish a satisfactory monism, it throws light also on some other of the questions that puzzle us. How is it that we do not feel our brain-motions to be brain-motions? We feel our feelings only; and when feeling our feelings we do not so much feel *that* we feel as *what* we feel. In other words, we feel the contents of our feelings; we feel their import, their meaning; we are aware of their significance; our consciousness is conscious of the object, the presence of which is indicated by this special feeling. Our attention is concentrated upon the messages conveyed by and contained in the different feelings.

These messages of certain feelings are the interpretations given either to certain sense-impressions or they are the thought-symbols representing some abstracts, representing certain features of sense-impressions.

How little we feel our brain-motions when we think, can be learned from the fact that some nations place the seat of thinking in the heart, others in the stomach or even the bowels, while even so great a naturalist as Aristotle regarded the brain as cold and insensible; he made the observation that man is in possession of the relatively largest brain, but he understood its function so little that he thought it served to cool the warmth rising from the heart.

It is strange that every subjective feeling so long as it remains within itself can neither be localised nor determined. We know nothing whatever of the brain-motion that thinks a certain idea. We can fairly assume that every idea is in its objective existence a peculiar kind of brain-motion taking place in a particular part of the brain, but we are not conscious of the brain-motion as a special and localised motion. We are quite unable to tell the difference that we must suppose to exist between the forms of the brain-structures or combinations of brain-structures and their motions when we think say for instances of virtue and of vice. We are conscious only of the idea and not of their objective correlates.

Whatever we know of our body, we know only through sensation; i. e., by the same means by which we know of other things. Our body is to us, and is represented with the assistance of the senses, as an object in the objective world. As such it is localised and all its relations and activities are determined. Whatever subjective feeling we have concerning any state of ourselves, remains indistinct until with the help of the senses it is made an object to our observation. Who has not as yet made the experience that he was unable to localise a toothache. The pain itself gives no information either as to its nature and cause or as to the seat of the suffering. The pain itself is purely subjective. All the objective facts have to be localised with the assistance of the senses. The suspected regions must be made the object of experiments and if any irritation of a certain spot increases the ache, it will be assumed to be the seat of the pain. And even then how often is a patient mistaken not only almost always as to the nature but often also as to the seat of the pain.

These facts appear strange, but they cease to be strange, when we consider that the nature of subjectivity is feeling. Subjectivity can as little become directly conscious of its own objectivity as an eye can look at itself. However, an eye can look at its image in the mirror. So the complex of subjective existence, which is through the interaction of an organism united in what we call a soul, can and does turn the channels of its own senses back upon itself and thus forms an opinion concerning its own objectivity. Man's knowledge of his own objective existence is not due to any internal and direct perception of self, but solely to the same experience through which he receives information concerning the rest of the world.

P. C.

A REPLY TO A CRITIC.

WITH A DISCUSSION OF NECESSARY TRUTHS.

To the Editor of The Monist:

I hope it is not a breach of etiquette to ask you to forward to your reviewer the following remarks in reply to his criticism of my work (*The Foundations of Geometry*, reviewed in Vol. II, No. 1, of *The Monist*). If he is good enough to review my second book also, I think they will clear up some misunderstandings.

Your reviewer commences with some general remarks, against which I have

nothing to say. He then proceeds to consider my "requirements for a logical definition." Here he seems to find a difficulty—which may be due to my not having expressed myself clearly. If so I hope he will read what I say on the same subject in my *Essay on Reasoning*, which I cannot believe he will find "indefinite" or not well "issuable." But indeed I cannot see where his difficulty comes in with my old statement of the case. I state perfectly clearly that requirements (3) and (4) are not *logically* necessary for a definition, but are only required if that definition is intended to give a *particular meaning* to the word. He tries to reduce my argument *ad absurdum* by giving a definition of "troft." But so far from being absurd his definition is perfectly good. According to it "troft" would include in its denotation all our percepts and concepts. When however he goes on to say ". . . . These significant names must be so used that the intellectual sensibility shall be excited to perceive that which is intended to be defined," I differ from him entirely. This is only required for a *description*, not for a *definition* (see *Essay on Reasoning*, p. 53).

Your reviewer's only solid objection to my "requirements" seems to be that the fourth includes all the rest. This is only true if the term proposed for definition has an import which has already been determined; but even in such a case it is better to consider the requirements separately, as I have given them. For the force of objections under the different headings varies enormously. An objection under heading (1), if established, would be fatal to any definition whatever. One under heading (2) so far from being fatal would only be a suggestion for the improvement of the definition. Objections under either of the headings (3) and (4) would only be to the effect that the term as defined meant something different from what it was desired that it should mean. It is however convenient to consider (3) and (4) separately as it would generally be possible to decide (3) at once, whereas if a doubt were raised under heading (4) it might lead to a prolonged discussion before it could be laid. I do not however pretend that the "requirements" are laid down in my *Foundations of Geometry* in the best possible form. Indeed I have altered the form in my second essay. There is moreover one requirement for a logical definition which is not included in my heading (1) in the *Foundations of Geometry*, though it is included in (4). This defect is remedied in the *Essay on Reasoning* (p. 55). It is curious that your reviewer should have missed this point, as it is the very one on which he attacks my definition of "direction." It is that the assertions in a definition must not be *independent* of the meaning of the term defined. If they were, the assertion would be equally true (or false) whatever meaning the term might have. The *import* of the term would therefore be unlimited. In the case of explicit definitions a similar error is called *circulus in definiendo*.

When your reviewer goes on to attack my definition of "direction" why does he change his front all at once, and disregard all the considerations he has just been discussing? Why does he not apply my, or his own, requirements for a definition to the case in point? The criticism he actually does put forward will not bear a moment's investigation. If my definition is "circular," the assertion must be equally

true whatever meaning is ascribed to the term. Well, then, let us try the effect of giving to it the meaning we ordinarily ascribe to "cheese." Is it equally true that "a cheese may be conceived to be indicated by naming two points, as the cheese from one to the other"? Clearly not. But not only does this one assertion out of my definition exclude the import of "cheese" from the meaning of "direction," but, more particularly, it distinguishes between the "three distinct but closely associated notions" which your reviewer quite rightly says "become confused in thought and expression unless the most solicitous care is taken to distinguish them." This is exactly the care which I *have* taken, by framing my definition.

I need not say much about the rest of the criticism. Your reviewer's remarks on my definition of "angle" are simply due to the fact that he has not read the definition carefully, and probably has not read the note on the top of page 36 at all. It may make it clearer to him if I point out that if "we imagine a northeast-southwest line cutting an east-west line," we imagine *four* different directions and therefore $\overline{4 \cdot 3}/\overline{1 \cdot 2} = 6$ angles. Two of these are the straight angles between the opposite directions of each of the two lines. The other four are what Euclid calls "the angles between the lines." As an angle, according to my definition, has no local habitation in space, it is, *prima facie*, meaningless to talk of the "right hand upper angle." But if this is only an abbreviation for "the angle between the directions upwards and to the right," then "the right hand upper angle" means the same as it would in Euclid.

With the remarks about the nature of the challenge I have thrown down I heartily agree. May I however suggest that I have a right to expect that criticism should be, not only "competent and candid," but careful? It is a difficult subject, and *I* at least am not always able to express myself in such a way that my meaning cannot be misunderstood by any one. I think if your reviewer looks at what I have said again, with the aid of what I say further in my *Essay on Reasoning*, he will see that his criticisms have really originated in misunderstandings, and perhaps he will alter his judgment that I have "come short of the high result to which I aspired."*

But my chief object in writing to you to-day is to bring specially to your notice my ideas on the nature of so-called "necessary truths." I am not quite clear how far you will find my views harmonise with your own. To a great extent I am inclined to think they are simply a further analysis of the views you express in *The Monist*

* The reviewer of Mr. Dixon's book has read these remarks on his criticism (*The Monist*, Vol. II, No. 1, p. 126) and has given them what seems to him full consideration. He confesses that he misunderstood what Mr. Dixon meant by "a direction." (See the article "Logic as Relation-Lore" to be published in a subsequent number.) In regard to the requirements for a logical definition he must still abide by his former opinion. The need of a definition arises either from the inaccuracy in the application of a term or from a supposed lack of knowledge as to its signification. Hence to use the term itself in its own definition is to import into the definition the same vagueness or ignorance which it is the very office of a definition to correct. When Mr. Dixon says that it is requisite for a logical definition that the defining assertions "must not be *independent* of the meaning of the term defined," what is that but to say that the same must be *dependent* upon that meaning? which, unless the reviewer again misunderstands the author, is to say that we must understand the meaning of the term before we can understand the definition. ρσλ.

and in your *Fundamental Problems*. I will briefly sketch my own ideas and you can then judge whether they are yours also or not.

In my *Essay on Reasoning* I classify assertions as Truisms (assertions whose truth depends solely on the definitions of their terms) and Real Assertions, which convey some real subjective or objective information. I show that the validity of all purely formal knowledge depends on the fact that it is deduced from definitions alone, which are laid down *arbitrarily* and that the supposed peculiar certainty of the theorems of pure mathematics is merely due to the fact that they are all truisms. Thus, I think it a misnomer to call such theorems "necessary" truths. It would be nearer the mark to call them "arbitrary" truths.

There is no *necessity* whatever about the theorem "twice two is four." "Two" is defined as $1+1$; "twice," as the operation of adding a thing to itself. It follows from this that "twice two" is $1+1+1+1$; and this, by *definition*, is "four." If "four" were defined as $1+1+1$, (and there is no "necessary" reason why it should not be,) then "twice two" would *not* be "four." The assertion "twice two is four" conveys no real information whatever—at best it could only tell us what one of its terms meant if they had not all been previously defined.

I cannot insist too strongly on the importance of a proper understanding and use of logical definition. If you desire to know whether a given assertion is true or false, *a priori* or *a posteriori*, the first step in the investigation MUST be to find out how its terms were defined. If it turns out that the truth (or falsehood) of the assertion can be formally deduced from these definitions, then the assertion is a truism (or contradiction in terms): in either case it can give no real information, and even if true cannot be a "necessary" truth. Only if the definitions of the terms are both independent and consistent is it open to discussion how we might come to a knowledge of the fact it expresses.

I may briefly indicate here how I think the problem ought to be attacked. "Objective facts" can only be established by induction. I do not mean by that term necessarily the process described by Mill, but some similar process, based ultimately on *inductio per enumerationem simplicem*. Now no such process can ever lead to a necessary truth. The most fundamental and certain induction which can be made, that which induces us to believe in the objectivity of our environment, does not lead to a "necessary truth"; and much less can any other induction based upon this one do so. "Objective facts" then may be established with greater or less probability, but can never be *necessarily* true. But all inductions are based on our perceptions, that is ultimately on our subjective sensations. And a man can, nay, must be, absolutely certain of the reality of his own sensations though he cannot be certain of the interpretations he puts upon them. If I have a toothache I cannot be absolutely certain that I have a tooth, but, at least while the pain lasts, I am *absolutely* certain that I have an ache. And so of any subjective sensation.

I can similarly be absolutely certain that I entertain a given concept, while that concept is before my mind; though of course it is possible that if I assert the pos-

session of that concept I may do so in language which may be misunderstood by the person I am addressing. If then a man has certain concepts which he can call up at will, the reality of those concepts, *qua* concepts, is to him a *necessary truth*. He may lay down such necessary truths as axioms, and by their aid he may give real subjective import to a symbolic argument, and so obtain new and complicated assertions which are also to him necessary truths. This is what I do in my subjective theory of geometry. That theory might be regarded as purely symbolic—the axioms might have been left out, and all its conclusions looked upon as mere truisms. The conclusions of geometry of four or more independent directions can perhaps *only* be regarded as truisms. But by the aid of the axioms, geometry of two and three independent directions can be given real subjective import, and its conclusions therefore regarded as necessary truths, as long as they are only taken subjectively. They may further be applied objectively by the aid of objective facts established by induction, but in this case their validity is no greater than that of the primary facts, the counterparts of the subjective axioms, which are employed to give the theory objective import.

I confess I have not studied Kant sufficiently to say that his views differ materially from mine, though I always thought they did until I read your interpretations of them. Perhaps I misunderstood the sense in which Kant used the term *a priori*. The term has been used in so many different senses that I prefer myself to drop it altogether. If it merely refers to priority in time there can be no practical doubt that, whether in the case of the human race or of an individual thinker, a large amount of sense-experience must have preceded even so simple an *a priori* judgment as "twice two is four." If the term merely refers to priority in logical validity it seems to me better to say that "such and such assertions are not dependent upon experience." But Kant says of the assertion "$7+5=12$" that it is not only "*a priori*" but "synthetic" By the latter term he means that its truth was *not* deduced from definitions alone, and that the assertion therefore conveys real information. In this I believe he was wrong, and though he afterwards declares that "all knowledge *a priori* is empty and cannot give information about things," unless the true nature of *a priori* knowledge is made more clear, people will inevitably continue to believe the contrary—and to believe moreover that Kant taught so.

Any language which seems to imply that there is some dread necessity about mathematical truths—that they could not be otherwise if they would—is very misleading. Of course it is necessarily true that *if* you have seven objects and add five more to them you will have in all twelve objects. But the whole objective difficulty is begged by the supposition. "Much virtue in if!"

As I understand it the essence of the "laws" of pure mathematics is that they are verbal, that is they are only abbreviated expressions of the results of certain verbal processes. If the processes are repeated and the results similarly expressed, the results must always be the same. Our reason cannot "inform us about the form of existence" unless it is first given, as the *data* or facts which correspond to the defi-

nitions of our symbolic arguments. It is only because our reasoning faculties are limited that symbolic arguments are necessary at all—that it is not evident to us at once that the conclusions of the most intricate mathematical calculations are given to us along with the *data*. Given the data, then in all possible worlds the conclusions must indeed follow, but only because they really are already *in* the data which were given.

It may be that you will not only agree with all I have said, but have already said much of it yourself. But there are some passages in your *Fundamental Problems* which seem to imply otherwise. I think the great objection I have to urge against Kant, and also perhaps against you, is that you do not distinguish as clearly as I could wish between symbolic argument and real, though subjective, knowledge. And the only way to distinguish between them is by inquiring into the definitions of the terms.

For example, on p. 165 of *Fundamental Problems* you say that to four-dimensional beings Kepler's third law "would most probably appear as 'the cubes of their times of revolution being proportional to their mean distances to the fourth power.'"

Now what sort of assertion do you take Kepler's law to be? Originally it was a purely empirical law obtained by pure induction. If the four-dimensional people obtained their law the same way why should the result appear different to them? Or do you conceive the law to be deduced from Newton's theory of gravitation? But even so the law of the inverse square was obtained empirically. If you think that law can be explained (as the analogous law for the distribution of light can) by the supposition that the integral of the force over all points at a given distance from the origin is constant, still this supposition is purely gratuitous unless established by induction from experience. If you grant any one of these suppositions you can by symbolic argument obtain the law corresponding to Kepler's for a four-dimensional space. But I may mention that in no case does the result you anticipate come out. On the first two suppositions the law would be unaltered. On the last supposition the law of gravity would be changed to the inverse cube; but after that the solution of the problem has nothing to do with four dimensions—it is a two-dimensional problem only. The result is that in general planets could not move in closed orbits at all. They might conceivably revolve in circles, but such a condition would be unstable, and if it obtained their periodic times would vary as the squares of their distances.

Again you say (p. 74) "the doctrine of the 'conservation of matter and energy,' although it has been discovered with the assistance of experience, can be proved in its full scope by pure reason alone." I should very much like to see your proof (which I cannot find in *Fundamental Problems*). How do you define the terms of the doctrine? Do you deduce the proof from these definitions—that is do you make it a truism? Or do you base it upon subjective axioms as I do my geometry? Or if you base it on objective facts, how do you prove those facts by pure reason alone?

And if it is purely a subjective proof, how can you say the doctrine is proved "in its full scope"? Surely objective applications come within its scope?

It would not be fair in me to ask you to publish my reply to your reviewer's criticisms, though if that reply is justified the criticism must have done the prospects of my book some injury, seeing from what a quarter it comes. But I hope you will see your way to publishing the latter part of this letter in *The Monist*, together with your reply to it, if you think it worthy of such a distinction.

I have just come across, in this month's *Nineteenth Century*, another remarkable instance of reasoning which seems to be rendered entirely nugatory by the want of proper definitions. It is asserted that conceptual thought is impossible without language. At first sight this would certainly appear to be a real assertion. It follows from it that since dogs have no language they have no "conceptual thought." But it may be plainly shown that dogs do entertain "general notions," which in ordinary English would be included under the head of "conceptual thought." The apparent contradiction is however explained when it appears that the author distinguishes general notions as "concepts" or "recepts," according as they *are* or *are not named*. This being his definition of "conceptual thought" as opposed to other thought, it appears that the assertion is only a truism after all, and conveys no real information whatever. To discuss it further is then mere waste of time. The author of the assertion doubtless *wished* it to convey some information, but he did not attend to his definitions and so failed to attain his object.

EDWARD T. DIXON.

MATHEMATICS A DESCRIPTION OF OPERATIONS WITH PURE FORMS.

IN REPLY TO MR. EDWARD DIXON.

It is true, as Mr. Dixon says, that "Any language which seems to imply that there is some dread necessity about mathematical truths is very misleading." But to say, as Mr. Dixon does in another passage, that the truisms of mathematics are arbitrary truths, is more misleading still. The theorems of the formal sciences are not "assertions whose truth depends solely on the definition of their terms." They are "real assertions which convey some real subjective or objective information."

Mr. Dixon objects to Kant's assertion that $7 + 5 = 12$ is not only *a priori* but also synthetic. He declares, in contradistinction to Kant, that it is deduced from definitions alone; that therefore it is empty, and cannot give any information about things. This latter proposition, which is a phrase of Kant's, appears in this context as an inconsistency of Kant's. And it would be an inconsistency, if it had to be understood in the sense in which Mr Dixon quotes it. We construe Kant's phrase that "the *a priori* is empty, and cannot give information about things," in a different way. We think that Kant intends to say that the *a priori* imparts real information concerning relations and forms; but that it does not impart real information con-

BOOK REVIEWS.

SOCIAL STATICS. Abridged and Revised; together with THE MAN VERSUS THE STATE. By *Herbert Spencer*. New York: D. Appleton & Co., 1892.

JUSTICE. Being Part IV of the Principles of Ethics. By *Herbert Spencer*. New York: D. Appleton & Co., 1891.

Among Mr. Spencer's most important books are those entitled *Justice* and *Social Statics*. The latter, which first appeared in 1850, has just been republished in about one-half of the original size, some parts having been transferred to the book on *Justice*, and others omitted altogether. "One difference," as he says, "is that what there was in my first book of supernaturalistic interpretation has disappeared, and the interpretation has become exclusively naturalistic—that is, evolutionary.' Another change is that a demonstration of the injustice of socialism is substituted for his former arguments, plainly repudiated in *Justice*, against private ownership of land. Equally important is the omission of the chapter asserting "The Right to Ignore the State."

The demand for Woman Suffrage has also been withdrawn from the new edition of *Social Statics*, though it retains the original protest against "the reign of man over woman," and asserts an "equality of rights in the married state." Here again, Spencer's final position must be sought in his *Justice* where it is urged that women cannot justly have equal powers with men unless they have equal responsibilities. They cannot serve their country as men do; and if they take an equal share in the government, "their position is not one of equality but one of supremacy." Even in time of peace, they are, he thinks, too impulsive to vote judiciously, too sympathetic to oppose "fostering the worse at the expense of the better," and too fond of "a worship of power under all its forms" to protect individual liberty against the encroachment of authority. This objection seems particularly strong, because there is still great danger of the growth of state despotism at the expense of personal freedom, even in republics. Many recent instances are given by Spencer in "The Man versus the State," now reprinted in the same volume with *Social Statics*; and it is urged in *Justice*, that even in the United States "universal suffrage does not prevent an enormous majority of consumers from being

heavily taxed by a protective tariff for the benefit of a small minority of manufacturers and artisans."

Our voters are much too ready to follow hasty impulses and unscrupulous leaders; and both faults are most common among the most ignorant. How strongly education encourages independence was acknowledged by those slave-holders who said, "Our negroes shall not learn to read, for that makes them run away." Public schools have found their worst enemies among Popes and Czars, and their best friends in the statesmen most honored by republics. There is no other institution for whose advantages Americans are practically unanimous. The necessity of popular education at the public cost is acknowledged by Huxley, Mill, and other advanced thinkers so generally, that Spencer's exceptionally hostile opinion ought not to be taken as a self-evident truth.

Mr. Spencer's examination of this subject does not appear to have been so thorough as the occasion demands. In denying that education prevents crime, he relies mainly on Joseph Fletcher, who, as stated in both editions of *Social Statics*, "has entered more elaborately into this question than perhaps any other writer of the day," and who admits that there is a "superficial evidence against instruction." Spencer takes no notice of Fletcher's having succeeded completely in breaking down this superficial evidence. In elaborate papers, published in the tenth, eleventh, and twelfth volumes of *The Journal of the London Statistical Society*, and illustrated by many tables and maps, Fletcher shows that the proportion to the population, in various parts of England, of people unable to sign their names, corresponded everywhere to the proportion of illegitimate births as well as of commitments for crime. Separating these latter into classes according to degree of guilt, he proves that the worst crimes are most common where there is the most ignorance. Thus he is enabled to say, "The conclusion is therefore irresistible that education is essential to the security of modern society." That this testimony of Spencer's principal witness is really the truth can be further proved by the statistics in the *Encyclopædia Britannica*, showing that between 1841 and 1876, while the percentage of illiterates to population in England and Wales was reduced one-half, that of criminals was reduced to one-third of what it was originally. (Vol. VIII, pp. 221 and 249–251.)

Spencer also refers to the fact that schools have sometimes been carried on in the interest of despotism; but most kinds of food are easily adulterated; and education is valuable, notwithstanding, as food for liberty. This last consideration disposes completely of his comparison of state-churches with state-schools; and the fact, mentioned in the revised but not in the original edition of *Social Statics*, that opinions differ about the best methods of education, is really an additional instance of the encouragement given by our system of public schools to independence of thought.

Spencer's chief objection to this system is that it does not fit his theory that 'the liberty of each, limited by the like liberties of all, is the rule in conformity

with which society must be organised," (p. 45). Such a "law of right social relationships," (p. 55) would, he admits, require us to repeal our laws against indecency, abolish our Boards of Health, and close our poorhouses, postoffices, banks, and lighthouses, except in so far as these institutions, like our streets and roads, might be cared for by benevolent individuals. He does not tell us how a government, thus limited to managing the police, army, and navy, could keep up a fire-department, nor how new streets, roads, railways, or canals could be opened, in case the owners of land put their prices too high for the projectors; but the most unfortunate application of his theory would be to close our public schools.

There is no danger of this, however; and the principal evil likely to result from his pushing his theory so far, is that he prevents people from seeing its real value, as indicating the direction in which our race has advanced and must make all further progress. We shall keep on diminishing the power of the state over the man, as well as that of the man over the child, but neither authority will ever be abolished entirely. We shall dispense, sooner or later, with some of the public institutions which Spencer condemns; but our common schools will, I think, last as long as government itself. The abolitionists helped the slave to freedom by pointing out the North Star; but they did not advise him to quit solid earth. This mistake, although we grant that Spencer shows us our North Star, is sometimes made in *Social Statics*.

Timely help, too, is given by him, in a thoroughly practical way, to those reformers who are passing out from under the cloud with a silver lining into a Cleveland summer and a fair prospect of a Harrison fall. Among the words best worth putting into actions at once, are these: "The right of exchange is as sacred as any other right, and exists as much between members of different nations as between members of the same nation. Morality knows nothing of geographical boundaries." . . "Hence, in putting a veto upon the commercial intercourse of two nations, or in putting obstacles in the way of that intercourse, a government trenches upon men's liberties of action, and by so doing directly reverses its function. To secure for each man the fullest freedom to exercise his faculties, compatible with the like freedom of all others, we find to be the state's duty. Now trade prohibitions and trade restrictions not only do not secure this freedom, but they take it away. So that in enforcing them the state is transformed from a maintainer of rights into a violator of rights." . . . "Whether it kills, or robs, or enslaves, or shackles by trade regulations, its guilt is alike in kind, and differs only in degree." (*Social Statics*, ed. of 1850, pp. 326, 327; ed. of 1892, p. 137). F. M. H.

AN ESSAY ON REASONING. By *Edward T. Dixon*. Cambridge (Eng.): Deighton, Bell, & Co. 1891. Pp. 88.

Some years ago the author of this essay made public certain views of his, on "Geometry of Four Dimensions." He was surprised to find that though his arguments were received with incredulity they were not refuted. This result appeared

to him to be due to the fact that he was not understood, that his views on geometry of even two and three dimensions being different from those commonly entertained, he had failed of being understood, because he had not begun his explanation at the beginning.

He therefore set to work to analyse those views and ultimately published a book on the subject. This book, *The Foundations of Geometry*, was reviewed by us in *The Monist* of October, 1891. But now again the author regards himself as not understood. He rested the positions and arguments of his book upon certain views of logic and especially of definition, which depart from the orthodox views, and he misjudged the fullness of explanation that would therefore become needful. Hence this little essay.

The proper approach to the views of the author is through his doctrine of definition. Usually definition is regarded as finding its main motive and utility in the convenience of social converse. The meaning of any term is regarded as resting not in the choice of him who utters it, but in the suppositions of those who are addressed. It is true that a license is accorded to any one upon a sufficient occasion to give a special intent to some word, but only upon condition that that intent shall be made sufficiently express, in other words well understood by those addressed. Hence definition is usually taken to mean the recital or the precision of the meaning of a term by means of language naturally apt for that end. There is no good sense in pretending to effect either one of these ends by language that lacks natural ability on that behalf.

Now Mr. Dixon holds, if we understand him, that conventional usage is of very subordinate consequence in this matter, that it pertains to the prerogative of an author to throw upon those whom he addresses the task of gathering his meanings as best they can; that even when he professes to explain his meanings he need not seek and employ any plain, direct speech, but may supply his instruction indirectly: may ask his audience to solve a problem, or to rightly guess what certain hints mean; may require them to extract the meaning in question out of a set of assertions that involve the same in a collateral way only. This he calls "implicit definition." It is analogous, he tells us, to an unsolved equation or set of equations in algebra. So far as we are aware no one can claim priority of the author in respect to this expedient. He seems to regard it as of great importance, and proposes by its aid to overcome the difficulties that environ the fundamentals of geometry.

We think that the author is led to put undue confidence in his implicit definition, by his peculiar views upon propositions. He holds that all propositions can, without loss or gain in the meanings as originally stated, be reduced to statements of strict identity. This done, propositions can, as he thinks, be operated upon after the fashion usual with equations. But we submit that between a logical proposition and an algebraic equation there is a difference that is in general irreducible. For example take this proposition, Every parent loves children. To alter this to, Every parent is identical with some [or every] person that loves children, as is, we think,

the prescription of Mr. Dixon, will not serve; for by reading our identity in the reverse order we have: Some [or every] person that loves children is identical with every parent.

Mr. Dixon's views in respect to terms and to the doctrine of denotation and connotation depart as widely from the suppositions usually held, as do his views regarding propositions and definition. To follow out the consequences of his proposed innovations in any adequate fulness is forbidden to us by lack of space. We feel sure that further reflection will lead him to much modification of his doctrines. *ρσλ.*

OUTLINES OF A PHILOSOPHY OF RELIGION. By *Hermann Lotze*. Edited by *E. C. Conybeare*, M.A. London: Swan, Sonnenschein, & Co. New York: Macmillan & Co. 1892. Pp. 176.

This book is an excellent translation of one of the most important works of a prominent philosopher, who made an unusually strong impression upon the minds of his contemporaries. Almost every line of this clean, accurate, and charming translation betrays the translator's devotion to the subject, for he has taken the utmost care to bring out the ideas of the author in the same brilliant style for which Professor Lotze is justly famous.

The translator says in the preface: "I have completed and venture to publish "the following translation of Hermann Lotze's *Lectures upon the Philosophy of "Religion* in the same hope in which it was undertaken by my late wife, that it "may be of use to some who cannot read the German original, and yet desire a con- "cise statement of the form in which one of the clearest-minded of our later thinkers "put to himself those great questions—as to the origin and destiny of the spirit of "man, as to life in general, and the meaning of the material universe—which occupy "us all at some time or another, many of us as soon as we have won food and shel- "ter for our bodies."

We do not share Mr. Conybeare's and his deceased wife's enthusiasm for the author. Although we are not blind to the great deserts of Professor Lotze, his amiable personality, the depth of his religious and emotional nature, the breadth of his scholarly erudition, and the brilliancy of his ingenious, not to say poetical, presentation of philosophical subjects, we cannot conceive that his work is come to abide. On the contrary, we consider his philosophy as antiquated in many respects. He considers problems that originate from a mere confusion of ideas, as being insolvable in their nature, and attempts the solution of other problems with inadequate methods. His thoughts still remind us of the ontological spirit of past philosophies, and his principles are not in agreement with positivism and the methods of scientific research.

As an instance, we quote the following passage: "We must ever set aside any "attempt to describe in positive terms, or to construct in thought, the process by "which this absolute being came to be not only one, and that unconditionally, but "at the same time a many of things which condition one another reciprocally."

Lotze still believes in an "absolute unity" as something prior to the world of reality, and he declares that "We cannot Know or Explain how this Absolute Unity is also Many" (Sec. XXI); and even if an unconscious being could be a Many-in-One, yet it could not, according to Lotze, generate consciousness (Sec. XXV). We do not believe that this problem is insolvable, and do not, as does Lotze, feel constrained to fall back on idealism. In fact, our position is so different from Lotze's that in spite of the full recognition of his genius, we feel as much severed from him as if he belonged to ages long gone by.

Mr. Conybeare's translation is most certainly an invaluable work and is indispensable for any English student of Lotze's philosophy. *κρς.*

On the Perception of Small Differences, With Special Reference to the Extent, Force, and Time of Movement. By *George Stuart Fullerton* and *James McKeen Cattell*. Philadelphia: University of Pennsylvania Press. 1892. Pp. 159.

This volume of the Philosophical Series of Publications of the University of Pennsylvania gives an account of a large number of experiments made for the purpose of testing the perception of small differences of movement, of weight, and of light. The most noticeable conclusion arrived at by the authors, is that they cannot accept any of the received explanations of Weber's law. They found from their experiments, by the method of estimated amount of difference, that "we tend to estimate the intensity of sensation as directly proportional to the intensity of the stimulus; consequently, in so far as any deduction concerning quantitative relations in sensation can be made from such estimation, the sensation increases as the stimulus and not as its logarithm," thus invalidating Fechner's law. The authors believe also that Weber's law does not hold for the perception of movement, as they find that the error of observation usually increases "as the stimulus is taken greater but more slowly," and that it is proportional to the square root of the stimulus. Accordingly, they substitute for Weber's law the following: "The error of observation tends to increase as the square root of the magnitude, the increase being subject to variation, whose amount and cause must be determined for each special case." It is proper to add, that Professor Fullerton gives only a qualified assent to these conclusions, on the grounds that mathematicians are not agreed as to the soundness of the theory upon which the law is based, and that the errors in question may not be independent errors. He considers, however, the results obtained by the authors "as sufficiently in accord with the laws to justify them in holding it tentatively, and subject to criticism."

As Fechner's law rests on that of Weber, and on assumptions which appear to be incorrect, it also fails, and it follows that the psychophysical, physiological, and psychological theories put forward to account for the supposed logarithmic relation between mental and physical processes are superfluous. From these conclusions

we may judge of the importance of the experiments made by Professors Fullerton and Cattell, whose work requires to be carefully studied by all those interested in the special questions to which it relates. Ω.

PSYCHOLOGIE DU PEINTRE. By *Lucien Arréat*. Paris: Félix Alcan. 1892. Pp. LIX, 264. Price, 5 fr.

The author of this interesting work informs us that it does not aim at being a natural history of society, nor is it even a study in professional psychology. This is hardly correct, however, as such a study must be based on that of individuals, and a writer of M. Arréat's reputation cannot treat of a large group of individuals without throwing light on the psychology of the whole class to which they belong. He very aptly likens artists as a whole to a large family, the artist in design to a genus of this family, and painters to a species. This has its varieties, and it is by the study of these that the author seeks to arrive at a knowledge of the psychology of the painter.

Believing that there exists a relation between the temperament and the qualities of the mind and that this is influenced by heredity, he devotes the first part of the work to questions of physiology and heredity. The second part deals with the painter's vocation, his æsthetic sentiments, his professional memory, and, as the evolution of art is connected with the progress of visual analysis, with his sense of sight. Then comes an examination of the general mental qualities of the painter his intellectual character, his various phases of memory and aptitudes, and the influences which affect his work. The fourth part of the book treats of the painter's character, his egoistic and sympathetic traits, his will, and his moral and social traits. And finally reference is made to questions of pathology, particularly defects of vision, and to "the miseries of genius."

On all these subjects M. Arréat has many acute remarks supported by numerous facts, often derived from painters themselves, who thus, says the author, will be found "living and speaking on each page, just as they are, and making themselves known by their works, sympathetic or disagreeable, indifferent or superior, but always interesting." It is noticeable, in connection with the important subject of heredity, that in a list of about three hundred painters almost two-thirds are sons of painters or of workers in art, and M. Arréat thinks that if more complete information were obtainable the proportion would be increased.

In the chapter on the miseries of genius, the author takes exception to the view expressed by M. Lombroso that the creative inspiration of genius is, at least in some cases, the equivalent of epileptic convulsion. That genius may lead to insanity is true; and M. Arréat admits that remarkable aptitudes have often appeared in a family at the beginning of its degeneracy. But he adds that painters are for the most part healthy, and they show hardly any more singularity than other men may have. He concludes his work with the following words: "Genius makes use of, as we have sufficiently shown, faculties which are common to nearly all men, if they

are unequally strong and variously distributed with each. Genius, moreover, in the most elevated sense that it can be understood, is an exception among artists themselves, and even in genius, the meeting together of several happy gifts is exceptional. But it is willingly attributed to all those, whatever may be their art, whose works are able to touch the human cords that vibrate the most profoundly. Painters appear to us to compose a well-marked type among such. The reader has seen the characters of it brought together and discussed in this volume: he will preserve its living image after having closed the book." This in itself furnishes a sufficient recommendation for the perusal of M. Arréat's work, which apart from its psychological value, is a perfect mine of gracefully written information about painters and their peculiarities. Ω.

PHYSIOLOGIE DE L'ART. By *Georges Hirth*. Traduit de l'Allemand et précédé d'une Introduction par *Lucien Arréat*. Paris: Félix Alcan. 1892. Pp. 247.

We have now occasion to review a work on a subject much akin to the preceding—a work which has been translated from the German by the same author, M. Lucien Arréat, and supplied by him with a very interesting introduction. This Introduction is in reality a résumé by M. Arréat of a series of studies by M. Hirth on physiological optics. These studies are of great importance and are classed by the French editor under the three heads of Form, Illumination, and Movement. The first of these comprises the subjects of monocular and binocular vision, the depth and the bilateral enlargement of the visual field, perspective and identical points. Under the head of illumination the effect of the "double bath of light" through the two eyes, the "luminous equation," and the problems connected with optical measurement are considered.

We have not space to exhibit fully the author's ideas on these topics, but we can state what are regarded by M. Arréat as the two principle propositions which give to them their life and unity. One of these propositions is, that the first function of our dioptric apparatus consists in furnishing to our central visual organ, which M. Hirth terms the *internal eye*, material which the latter has to interpret. The other is that it is necessary to get rid of mathematical concepts, which are much too rigid to be applied to the delicate problems of vision, and to fall back on visual sensation such as it is. These propositions imply, moreover, the admission of an electro chemical process, "without which the properties of the eye and the marvels of vision remain inexplicable." This last conclusion has a bearing on the nature of memory, or the recollection of the impressions received by the nerves and brain after the original excitation has disappeared. Thus, M. Hirth suggests that when we know the physiological procedure in the impregnation of cerebral molecules, or in their electric charging, memory will be found to be only the prolongation of the duration of consecutive images.

The inquiries of M. Hirth throw great light on the difference between monocular and binocular vision, for information as to which and other details of his optical

theory we must refer our readers to M. Arréat's Introduction. This concludes with a consideration of the perception of light-movement, the reproduction of which is said to require a special exercise of attention, direct or indirect. Here we have the third degree of attention, according to the views of M. Hirth, who regards it as artistic apperception, having its end in itself and capable of being reproduced through co-ordination of the movements perceived.

A considerable portion of the second and principal part of this work is occupied with the psychology of attention and of the related subject memory. The latter is defined by M. Hirth as "a sum of states of perception gradually accumulated by the various organs of sense," and it is thus not a special faculty of the mind. The mental condition which results from the action of memory is what is known as *disposition*. This disposition is transmitted from one generation to another, and becomes innate as the memory of the species. But it is intimately connected with the nervous system, and with the brain regarded as the electric storehouse of memories. It is in accordance with these ideas that the author explains the transmission of hereditary qualities, the problem which is at present engaging so much attention. The innate organisation is a conservation of nervous quality or temperaments associated with the anatomical disposition of the nervous system, and a certain condition of electrical tension among the cerebral molecules. The transmission of ancestral qualities depends, however, on the vigor and good condition of the germ, and as the organisation received from our earliest ancestors is the most persistent, the primitive "disposition" will subsist even without exercise whilst nutrition and circulation assure the continuance of molecular growth.

It is with the visual memory that the author is chiefly concerned, and he affirms that the optical phenomena referred to in the Introduction compel us to admit the existence in the brain of a central organ, which he terms the internal eye. In order to determine the position of this organ, which is the real seat of visual perception, to the exclusion of the retina, whose function has been overestimated, M. Hirth considers the anatomical and physiological aspects of the question, and he accepts the conclusion arrived at by H. Munk in his *Functions de l'écorce cerebrale*, that perception is the function of a particular portion of the cerebral cortex. There thus exist two visual centres or "internal eyes," one in each convexity of the occipital lobes, as shown in Plate V. of the present work. Munk's researches would seem to prove, moreover, that not only is there a general localisation of visual memories, but that each memory is fixed in a precise and determined place. The centres of memory and the centres of perception, which M. Hirth supposes to be simply a phase of memory, are the same. Moreover attention is connected with perception, but it is an imperfect state of memory. Attention requires the expenditure of force, while perfect memory acts spontaneously; and it is only in this form, "exempt from fatigue, that it becomes the passive servant of our instincts and sensations, of our voluntary acts, of our labor." Memory when perfect is automatic, and according to the theory of M. Hirth, who does not accept M. Ribot's monoideistic theory, it

is accompanied with automatic attention, which is the result of a gradual transformation of "energetic" attention, and attains in a normal adult an incredible development both in quantity and quality. This *latent* attention is required by the existence of latent memory, which is properly spoken of by M. Hirth as an organic attribute of the highest moment, seeing that it forms the basis of all individual acquirements. It would seem to answer, however, to what is often spoken of as the subconsciousness.

We can understand how this doctrine of latent memory and latent attention can have an important bearing on the question of the origin of the artistic sense, especially as each brain centre may be supposed to have its own memory, and each fundamental memory its special temperament. The activity of such centres is due in great measure, as pointed out by M. Ribot, to nutrition and blood-circulation but M. Hirth adds a third factor, electrical tension. According to his theory, cerebral activity rests ultimately on electricity, the invisible currents of which, maintaining the whole system in a state of tension, are "the inferior currents of the latent memory," the brain centres being electrical accumulators. This idea, which the author applies also to the explanation of colored visual memories, is open to strong critical objections. In relation to the particular subject of art, the author shows that the hereditary transmission of talent depends on the active maintenance of the special temperament of certain fundamental memories and their associations, and talent itself therefore depends on the existence of such a temperament. We here come in contact with M. Lombroso's theory of the physiological degeneracy of genius, which M. Hirth opposes with much force, and we think on the whole with success. This discussion occupies the last chapter of a work that, as our readers will be able to judge from the glance given here at some of its leading topics, has a scientific value quite apart from the special subject of art which it is intended to illustrate, and which it goes far towards establishing on a physiological basis. Ω.

LES ALTÉRATIONS DE LA PERSONNALITÉ. By *Alfred Binet*. Paris: Félix Alcan 1892. Pp. 323. Price, 6 fr.

In the present work, the accomplished director of the laboratory of physiological psychology at the Sorbonne has brought together and systematised all the most reliable phenomena bearing on one of the most curious subjects of inquiry now engaging attention. Notwithstanding the disagreement between different experimenters as to particular facts, all have arrived at the conclusion that, under special conditions, the normal unity of consciousness may be broken, and that then there is the production of several distinct consciousnesses "each of which can have its perceptions, its memory, and even its moral character." No one is better fitted than M. Binet to perform the eclectic work he has undertaken of discussing the recent researches on the alteration of personality, without regard to the special views of particular schools.

The subject is considered by him under the three heads of Successive Personalities, Coexisting Personalities, and The Alterations of Personality in the Experiences of Suggestion. The two first parts deal chiefly with phenomena presented by somnambulic and hysteric subjects. In the third part M. Binet applies the fact of the duplication of personality to the explanation of the phenomena of spiritism, the term he very properly gives to so-called spiritualism. He regards the supposed spirit agent as the subconscious personality of the medium acting under the influence of suggestion, a view which undoubtedly meets most of the actual facts of spiritism.

Notwithstanding the divisibility of the ego, there can be no doubt of the unity of the personality under normal conditions. The question is as to the nature of this unity, and the author follows M. Ribot in affirming that it consists in the coördination of the elements which compose it. He repudiates the idea that memory is the sole foundation of consciousness, as not only may one memory embrace different states, but the same individual may have several memories, several consciousnesses, and several personalities. For the opinion of M. Binet on other points we must refer our readers to the work itself, which forms an important addition to the International Scientific Library. Ω.

L'HOMME DANS LA NATURE. By *Paul Topinard*. With 101 Illustrations in the text. Paris: Félix Alcan. 1891. Pp. 350. Price, 6 fr.

The present is the third work in which Dr. Paul Topinard, the well-known pupil and successor of M. Broca, the founder of French Anthropology, has given to the public his general ideas in relation to the science of which he has made so profound a study. In 1876 he published his *Anthropologie*, which reflected in great measure the teaching of his master, Broca. Ten years later, in 1886, appeared his larger and more important work, *Eléments d'anthropologie générale*, which treated of the history and methods of anthropology, with various other subjects. Now Dr. Topinard gives us his matured ideas on "Man in Nature," by which is meant physical nature, the object of the present work being to show the place that man occupies physically among animals, and his probable origin or descent. It is not surprising that a writer who was the pupil of Professor de Quatrefages as well as of Professor Broca should declare himself a supporter of the principle of unity of composition, formulated by M. Etienne Geoffroy Saint-Hilaire, from which flows that of evolution, that is the natural derivation of beings from one another. As to the means by which this is brought about, the author reserves his opinion until the publication of a further work which he has in preparation.

Dr. Topinard devotes the second chapter of the present work to a consideration of the position to be accorded to anthropology in relation to the other sciences. He declares it to be a pure, concrete science, essentially anatomical and observatory, and thus distinguishes it from ethnography, which has to do with peoples under all their aspects. Both alike are branches of the science of man in its broadest

sense. If anything can be added to the author's explanation, it is that anthropology has to do with mankind as a series of *individuals*, while ethnography is concerned with the *groups* into which such individuals are collected. This is not inconsistent with Dr. Topinard's definition of anthropology as the science "which studies human races, the human species, and the place of man in the classification of animals." For all the facts on which it is based are derived from the observation of individuals, and when races are compared with each other, they are compared as ideal individuals, formed by a generalisation of certain prevailing qualities, just as mankind by a similar process becomes an ideal individual, a scientific Adam, who is compared with other animals. There is an apparent difficulty in relation to psychology which Dr. Topinard claims entirely for anthropology, but it disappears when we see how closely he associates psychology with physiology. He says, and we quite agree with him, that "characters of a psychological nature, reduced to their most simple expression, whether attributed to human races, or to the general human type, belong to ordinary physiological characters; the corresponding anatomical part takes its place by the side of other physical characters; the theory and explanation of intellectual operations, of feelings and volitions, belong to the special physiology of man and to the application of the ideas of general physiology."

While accepting as correct the division of anthropology, in its restricted sense into general and special, as proposed by Broca and Bertillon, the author thinks it does not conform to the plan which should be adopted if it is desired to proceed, by the method of analysis and synthesis, from the known to the unknown. The plan adopted by Dr. Topinard is, by analogy with the procedures of general zoölogy, to begin by recalling the general notions applicable to his subject as to the distribution of animals by groups of varying values, the choice of characters on which they repose, and the differences between the race, the species, the family, and the order, these last forming the pivoting point of his views as to the place of man in classification. Then commences the study of characteristics, the mode of ascertaining them, of putting them to use and of appreciating their value, accompanied by examples, drawn from special anthropology, proper to illustrate the methods employed. Finally, a parallel is drawn between man and animals, that a conclusion may be arrived at as to the place of man in the series of beings, and his probable genealogy.

All these points are carefully considered by the author, who has framed a canon of the medium adult man of the European type, a figure based on which forms the frontispiece to the work. The proportions of this figure are derived from a comparison of all the most authentic published measurements, and the canon framed from them conforms closely to that recognised in artists' studios, except that in the latter the arm is too short and the neck too long.

The most generally interesting subjects discussed by the author are those connected with the relationship of man to other animals, and particularly the structure

of the brain. Dr. Topinard makes a careful comparison of the cerebral convolutions of various animals and man, with numerous illustrations, and he arrives at the conclusion that none of the characters said to distinguish man from the anthropoid apes are absolute; all are reducible to a question of degree of evolution, the superior degree being sometimes found among the anthropoids, and the inferior degree with man. The cerebral type of the anthropoids is a human type not completely developed, or the cerebral type of man is a developed simian type. Man thus undoubtedly belongs to the order of the Primates. After considering the form and volume of the simian and human brains, the author remarks that "man alone has a frontal lobe developed in all its parts, and filling up a large, concave, and deep frontal shell which externally gives place to the forehead, one of the characteristics of man."

Connected with the form and volume of the brain is the transformation of the animal skull into the human skull, and the relation of this transformation to the facial characteristics of man. These points, and also various questions connected with the bipedal or quadrupedal attitude, and with the attitude and function of prehension, are treated in detail, as are certain other distinctive simian and human characters. A chapter is devoted to a consideration of the important subject of retrogressive anomalies and rudimentary organs. In his concluding chapter Dr. Topinard points out the place of man in animal classification, and refers to the questions of his single or multiple origin, his genealogy and his future. In connection with the subject of classification, the author dwells on the fact that man is not the only relatively perfect animal, and yet that none of the mammalia, which we admire for their beauty or for their usefulness, equal the monkeys in the possession of a brain approaching the human type. The brain, the hand, and the attitude are the three characteristics which especially connect man with the monkey, and particularly with the anthropoids, and the question has long been agitated whether in these particulars the last named is allied more closely to man or to the other monkeys. Dr. Topinard affirms that in all these particulars the anthropoids should be classed with the other monkeys, and therefore that man stands alone.

As to the descent of man, the French anthropologist would seem to agree with M. Vogt that the type from which man has developed was also the source of the monkey and anthropoid types, and that it first appeared at the commencement of the Miocene period, when the earliest monkeys succeeded to the Lemurian of the preceding Eocene epoch. Dr. Topinard remarks that this conclusion is agreeable to that of the eminent American palæontologist, Professor Cope, who makes man descend directly from the Lemurian without passing through the monkeys and the anthropoids, basing his opinion chiefly on dentition. The question of the descent of man is connected with that of the singleness or multiplicity of his origin, and on this point the author does not express a decided opinion. He says that all existing types of humanity could be reduced to three, the Europo-Semitic, the Asiatico-American, and the Negro; if not to two, the White and the Negro. He adds that,

nevertheless, "in losing oneself in the depths of time, we can conceive the Negro, born the first, giving birth successively to the Australoid with frizzled hair, to one of the forms of the Brown stock with straight or wavy hair, and finally to the white European." Probably his actual opinion is to be gathered from his final statement when comparing the order of the Primates to a tree, that the Lemurians are its roots giving birth to several stems, of which one is that of the monkey, from which branched the anthropoids, and another, whose point of contact with the first is unknown, gives the actual human branch, which runs parallel to that of the anthropoids without being connected with it, and goes beyond it.

As to the future of the human race, Dr. Topinard affirms that the volume of the brain will notably increase, that dolichocephaly will give place to a universal brachycephaly, and that the cellules of the brain will be perfected in quality. As the human brain is being thus perfected, the animals nearest to the human type will disappear, and then man will really think himself the centre round which the universe gravitates, the sovereign for whom nature has been created. But even then the anatomist will bring him to himself by uttering the words of Broca, "Memento te animalium esse." This work, which forms volume seventy-three of the International Scientific Library, is sure to be widely read, and it will be indispensable to the student of anthropology, who will find in it all the information he requires on the methods of the science. Ω.

DIE URHEIMATH DER INDOGERMANEN UND DAS EUROPÄISCHE ZAHLSYSTEM. By *Johannes Schmidt*. Berlin, 1890. Pp. 56.

This essay is an important contribution to the problem of the place of origin of the Indo-Germanic languages. The author is confident that while nothing certain was known before, he has established at least one fact which will give us a clue to the solution of the problem. This fact is the interference of the duodecimal system with the decimal system. The former is of Babylonian origin, but its effects are noticeable upon almost all the Aryan tongues. The duodecimal system is not original with the Goths or with any of the Teutons, which can be proved by the fact that 60 or a *Schock* was a round number, but not twelve, the etymology of twelve (*twa-lif*) being two above a *lif*, which latter means a certain set. Thus when the Gothic hundred as a rule meant 120, when for a long time they distinguished between great hundreds (i. e. 120) and small hundreds (i. e. 100), this was due to foreign influence. For if twelve had been the basis of their number system, a *lif* would have meant twelve and the numerical arrangement would have progressed not in 10 x 12 but consistently in 12 x 12 or 144. Everything points to the supposition that the Babylonian *sossos* is still preserved in the German *Schock* (60). Accordingly, says Schmidt, the Europeans must have been exposed to a strong influence of the sexagesimal system; they must have been nearer to the centre of Babylonian civilisation than are the valleys of the Indus and the Eastern Iran. Professor Schmidt

considers Penka as refuted and also all those who regard Europe as the home of Indo-Germans.

We have to add that the eminent philologist when discussing the problem of the cradle of the Indo-Germanic languages does not touch upon the other problem of the home of the Aryans, the latter being mainly an anthropological question. Schmidt says (p. 13): "I do not intend to enter into the problematic domain of an-"thropology. The original race-characters of the Indo-Germanic nations, their "causes and the home in which they were moulded, also the physical conditions "and mixtures of the races which speak our languages, undoubtedly can be treated "with success only by the representatives of physical anthropology. But exactly "so the problem of the cradle of the original Indo-Germanic speech and the evolu-"tion of its several languages, as they are known in history, can be solved only by "philologists."

This is very true. Perhaps we shall approach the subject with better success if we learn to distinguish between the anthropological problem of the origin of the Aryan race and the philological one of the origin of the Aryan languages. A European origin of the one might not exclude an Asiatic origin of the other, and it still remains possible, that European Aryans when migrating south and east developed through their intercourse with semitic and other races the beginning of a civilisation which powerfully affected all the Aryans, since there is ample evidence that even in olden times a lively commerce took place between them. When Prussian amber is found in Pelasgian graves, why should not the sexagesimal system of the wealthy nations of the south have spread over northern countries? κρς.

LEHRBUCH DER HISTORISCH-KRITISCHEN EINLEITUNG IN DAS NEUE TESTAMENT By *Heinrich Julius Holtzmann*. Dritte verbesserte und vermehrte Auflage. Freiburg, i. B.: J. C. B. Mohr. 1892. Pp. 508. Price, 9 M.

It has been said that the scientific purpose of an academical text-book should be to educate the student to scientific independence, and its practical purpose to make it available for the adherents of all parties and denominations; and these two purposes are the surer attained the less the author represents his own conception as that which alone can be justified. This is the principle according to which Professor Holtzmann's *Lehrbuch* has been written. That he has fully attained his aim, will not be doubted by those who know his previous and painstaking labors, in which he proves himself as a theologian fully imbued with the spirit of science and scientific critique.

The first edition of this work appeared in 1885, the second in 1886, and the present and third edition can make the just claim of being carefully revised and perfected in every respect, so that it is to be regarded as a comprehensive, concise, and clear review of the critical materials of the New Testament. There is no doubt that the work as it now stands will remain the best book for reference of its kind.

Professor Holtzmann in a brief introduction of seventeen pages sketches the history and literature of New Testament criticism. The book is divided into two parts, the first treating the subject in a general way, the second entering into its several details. In the first part the author presents us with a history of the text and of its traditions, explaining the causes of the alterations that were introduced either unintentionally or by mistake; he reviews the critical apparatus for text-revision and also the history of the printed and revised editions up to the present attempt at emendation. Then a history of the canon is given, from the oldest Christian literature down to the radical criticisms of the present time. In the second and special part we find a careful compilation of all the criticisms concerning the single books and epistles of the New Testament. The first chapter treats of St. Paul's epistles to the Thessalonians, Galatians, Corinthians, Romans, to Philemon, the Colosians, Ephesians, Philippians, the pastoral epistles; further, the epistle to the Hebrews, which is non-Paulinian, the two epistles of St. Peter, the epistle of St. Jude, and that of St. James. The second chapter introduces us into the historical books of the synoptic gospels and the Acts, where, in a brief review of fifty-seven pages, we find the same data presented which are more fully explained in another publication of our author, reviewed in *The Monist*, Vol II, No. 2.

A new period in the development of Christian literature begins with all those writings which go under the name of St. John. A discussion of these books is contained in the third chapter, which treats of the apocalypse, the fourth gospel, and St. John's epistles. Not the least interest attaches to the fourth chapter, the subject of which is the vast domain of the apocryphal books of the New Testament, the number of which has, of late, been greatly increased by several new discoveries. The subject divides itself naturally into apocryphal gospels (Chap. II), apocryphical stories about the lives and deeds of the apostles (Chap. III), apocryphical epistles (Chap. IV), and apocryphical apocalypses (Chap. V). *Kps.*

SAMMLUNG VON POPULÄR-WISSENSCHAFTLICHEN VORTRÄGEN ÜBER DEN BAU UND DIE LEISTUNGEN DES GEHIRNS. By Professor *Theodor Meynert*. Vienna and Leipsic: Wilhelm Braumüller. 1892. Pp. 253.

This latest publication of Professor Meynert's was mentioned in the last number of *The Monist* by Mr. Christian Ufer, in the department "Literary Correspondence." Since its appearance Professor Meynert has died. His name has stood foremost for a great number of years in the ranks of psychiatrical investigators, and his contributions to the science to which he was devoted, have, perhaps more than those of any other, tended to its permanent advancement. The activity of his life has extended over a great number of years, and his labors have not only been applied to the theoretical interests of his science alone, but have also been directed—and this is the most important part of every scientist's work—to bringing the results of his investigations into connection with the great body of knowledge at large, and

especially to putting in popular form, and bringing within the reach of the general reader, the facts of the science which he contributed so much to establish.

The present lectures date from the year 1868. They owe their origin to the identification in later years of the interests of medicine with the interests which every human being has at heart, of resolving the mysteries of mental operations generally. Their main subject is the description and investigation of the structure of the cerebral organs; and the elucidation in the light of such description of the psychical operations of the brain. The fundamental facts of this province are not difficult. The main thing required is to free ourselves from the impediments which artificial thought on this subject has at all times imported into the consideration of intellectual facts. Our knowledge in this domain is founded on observation and introspection; not upon dialectics. Phenomena, simply, are presented to observation, and not the ultimate essences of forces. So, too, the apparatus of observation and introspection give only their own phenomena. Their contents are the animated external world as it affects conscious beings, and involves, besides intuition, the facts of memory. Unpersonal inherited memories, which take the form of instinct, are not forthcoming. The present lectures do not pretend to give instruction in the anatomy of the brain *per se*, but simply in so far as it is necessary to the understanding of the brain's mechanism. All things viewed, all things intuited are contents of consciousness, which in its limitations to the sense-impressions of the individual being, we term the ego, or *I*. In so far as the external world is the intuited contents of consciousness, the extent of the latter is increased, the ego, the *I*, expands into the secondary ego, or *I*. In this doctrine of a secondary ego the problems which grow out of the behavior of individuals towards the external world are resolved in the single explanation that the ego of each particular group of things seeks to preserve itself by internal and external motions. The ego is simply in the possession of itself in every extension which it acquires; if such extension consists of a common possession, its desire and tendency to preserve such is simply explained by the fact that such possession is the ego itself. Amongst the intuited objects of the ego are to be classed also as component parts of the secondary ego of every individual, the other living individualities of the world. From the point of view of this fact, the ego appears in its social rôle. The present lectures consequently extend to the consideration of the interactions of brains in society, to culture and civilisation, and seek to establish the phenomena of these domains as facts of physical knowledge. The method of physical inquiry is that of comparison by the alteration of the attendant circumstances in which the psychical mechanism acts. Physiology bases it on experiment. Nature also supplies experiments with the results that also embrace phenomena of culture. In the directions indicated here, the diseases of the mind afford a comparative means for the investigation of the phenomena of consciousness, a doctrine of natural cerebral experiments, and a foundation for a knowledge of the phenomena of mind.

μκρκ.

PERIODICALS.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE.

CONTENTS: Vol. III. No. 5.

UEBER EIN OPTISCHES PARADOXON. By *Franz Brentano.*

"FLATTERNDE HERZEN." By *Adolf Szili.*

UEBER BEGRÜNDUNG EINER BLINDENPSYCHOLOGIE VON EINEM BLINDEN. By *Friedrich Hitschmann.*

BEMERKUNGEN ÜBER DIE VON LIPPS UND CORNELIUS BESPROCHENE NACHBILDERSCHEINUNG. By *Otto Schwarz.*

CONTENTS: Vol. III. No. 6.

BEITRÄGE ZUR DIOPTRIK DES AUGES. By *M. Tscherning.*

OPTISCHE STREITFRAGEN. By *Th. Lipps.*

CONTENTS: Vol. IV. Nos. 1 and 2.

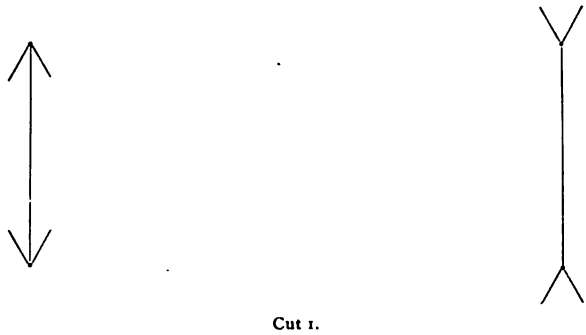
UEBER DIE SCHÄTZUNG KLEINER ZEITGRÖSSEN. By *F. Schumann.*

ZUM BEGRIFF DER LOKALZEICHEN. By *C. Stumpf.*

ZUR KENNTNISS DES SUCCESSIVEN KONTRASTES. By *Richard Hilbert.*

LITTERATURBERICHT.

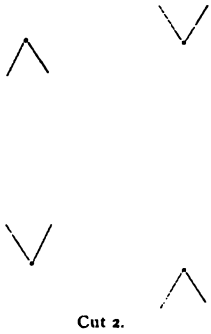
The first article is on an optical paradox. Let two equal parallel lines be drawn, as in the cut below; then let two small straight lines be drawn from the ex-



Cut 1.

tremities of these in such a way that in the first they form acute angles with the line and in the second, obtuse angles. The first, it will be seen, appears shorter than the second. What is the explanation of this phenomenon?

The author's answer is, that this phenomenon is a consequence of the well-known fact that we overestimate small angles, and underestimate large ones. The presence of the lines has nothing to do with the optical illusion, as the inserted



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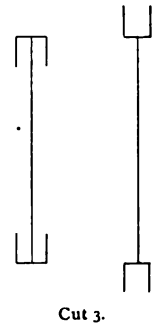
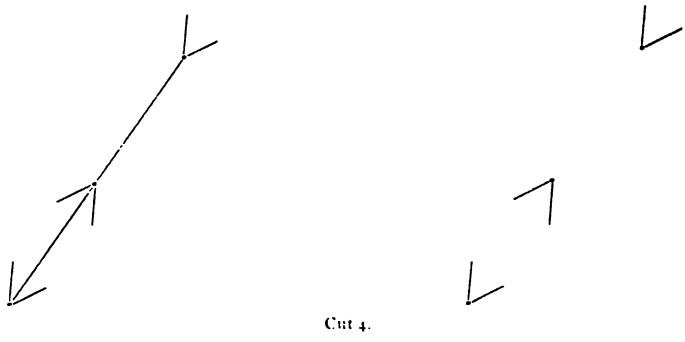
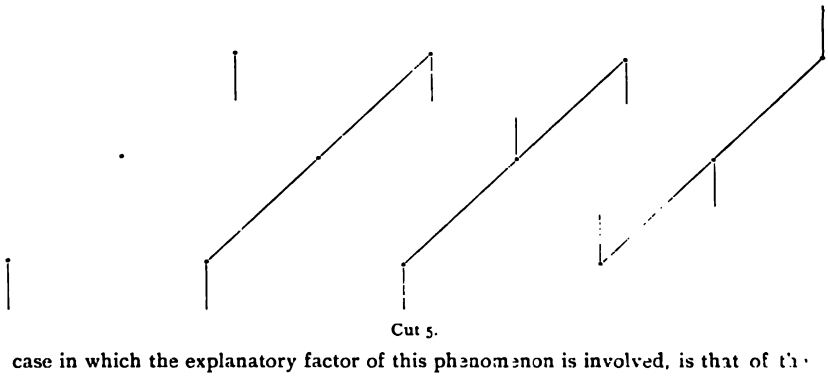


Cut 3.

cut, in which the lines are omitted, shows. (Cut 2.) The optical illusion is also not present when the lines are rectangularly attached, as is Cut 3. These facts prove that angular *inclination* is the decisive factor. The following cuts show this, the first in a more and the second in a less marked degree. (Cuts 4, 5.) The simplest



Cut 4.



Cut 5.

case in which the explanatory factor of this phenomenon is involved, is that of the estimation of the distance of an isolated point from the extremities of a short straight line The estimation of this distance is dependent upon our estimation of the angle made by lines drawn from the point to the extremities of a short line. If this esti-

mation is false, it produces by an exact trigonometrical law, an error in the estimation of the corresponding distance. This explains all. In our first figure the factor of illusion is eight times presented: hence its marked character.

The second article consists of a rather long series of experiments on the so-called "flatternde Herzen" by Adolph Szili.

The third article is on the foundations of a psychology of the blind, by a blind man, Friedrich Hitschmann, of Vienna. This article contains a number of interesting facts concerning the sensory, intellectual, and emotional life of blind people, and affords a great many valuable hints for the development of the special psychology which the author has in view.

The first article of No. 6 of the *Zeitschrift* is a very exhaustive one, some sixty pages in length, filled with special and technical investigations concerning the dioptrics of the eye. When light passes from one refracting medium into another it is partially reflected at the dividing surface, and transmits by reflection the objects from which it has proceeded. This is also the case with the human eye, which is itself a lens. The refracted pictures are the only pictures of importance to the possessor of the eye; but just as in the construction of optical instruments, the reflected or "lost" images are of supreme importance to the optician in the determination of the properties of his productions, so these same pictures in the human eye are of supreme importance to the physiologist and the psychologist. This is the subject of Dr. Tscherning's researches.

In the second article Dr. Th. Lipps discusses some mooted questions of optics. The first part of the article is a reply to Schwarz's criticism in the preceding number of the *Zeitschrift*. The second part is a review of Franz Brentano's explanation of the optical paradox, discussed in the second paragraph of this notice. Lipps declares, that, though there is some truth in Brentano's explanation, it is nevertheless an error to believe that acute angles, *as such*, are overestimated, and obtuse angles, as such, are underestimated. On the contrary, every time such errors in estimation occur, there exist particular reasons for it, the character of which renders the attempt impossible to derive the estimation of distance directly from the estimation of angles. Lipps supports his position by actual facts. His chief and most philosophical remark is, that it is a perilous and improper thing to do to explain isolated optical illusions by isolated and independent hypotheses; optical illusions are not exceptions: they constitute a class of phenomena in themselves, and they should be considered in their natural and logical connection. (Hamburg and Leipsic: Leopold Voss.) *μκρκ.*

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE. Vol. XVI. No. 3.

Ueber Real- und Beziehungs-Urtheile. By *J. v. Kries.*

Was ist Logik? By *A. Voigt.*

Zur Psychologie der Landschaft. By *R. Wlassak.*

Des Nic. Tetens Stellung in der Geschichte der Philosophie. By *M. Dessoir.*

The articles of this magazine are usually very rigorous and learned; and the contents of the present number are in keeping with its reputation. Prof. J. v. Kries discusses in an essay, evoked by the recent articles of Riehl, the subject of "real and relational judgments"; his object is to establish a classification, and display the logical connection, of judgments generally. Real judgments are predications

concerning reality or actual facts; relational judgments predicate simple relations of concepts, etc. The first requisite of a scientific exactness of thought, says Kries, is the distinction and determination in any given case of judgments which are real and judgments which are relational. In the second article, which is long and exhaustive, Dr. Voigt endeavors to determine the characters and functions of the different kinds of logic. In view of the great prominence into which algebraical logic of late years has come, this article is one of considerable interest. Voigt defines the pretensions and powers of the two opposing systems of philosophical and algebraical logic, and attempts to set forth the justification of each. Voigt, as opposed to Husserl, cordially recommends the study of algebraical logic to philosophers, that both disciplines may profit by the intercourse. (Leipsic: O. R. Reisland.) μκρκ.

PHILOSOPHISCHE MONATSHEFTE. Vol. XXVIII. Nos. 5 to 8.

CONTENTS: Nos. 5 and 6.

Die Wirklichkeit als Phänomen des Geistes. (Concluded.) By *A. Rosinski.*
Wesen und Bedeutung der Impersonalien. By *R. F. Kaindl.*
Zur Geschichte und zum Problem der Aesthetik. By *E. Kühnemann.*

CONTENTS: Nos. 7 and 8.

Ueber die Grundformen der Vorstellungsverbindung. Psychologische Studie. By *M. Offner.*
Zur Geschichte und zum Problem der Aesthetik. (Concluded.) By *E. Kühnemann.*
Werke zur Philosophie der Geschichte und des socialen Lebens (Second Article: *G. de Greef, Introduction à la sociologie*). By *F. Tönnies.*
Recensionen.
Litteraturbericht.

A. Rosinski's contribution is a metaphysical essay on reality viewed as a phenomenon of the mind. The results of his discussion are these: that the world of experience, with all its laws and phenomena, and all we assume to exist *per se*, is referable wholly to ourselves; that the primal source and cause of all reality is not a something which lies absolutely outside us, but is simply our own self, or ego. In what sense reality is reality, the author proposes to discuss in future articles.

Dr. Raimund Friedrich Kaindl discusses, in the second article, the character and meaning of the impersonal verbs. The discussion is made both from the psychologico-logical point of view, and from the point of view of comparative philology.

The *Philosophische Monatshefte* contain, in each issue, a very exhaustive bibliography of all the works which have appeared during the month in the provinces connected with philosophy. This department is conducted by Dr. Ascherson, the librarian of the Berlin University library, and forms a very important and valuable feature of this magazine. (Berlin: Dr. R. Salinger.) μκρκ.

ZEITSCHRIFT FÜR PHILOSOPHIE UND PHILOSOPHISCHE KRITIK. Vol. 100. Nos. 1 and 2.

This well-known magazine, formerly edited by Dr. J. D. Fichte and Dr. Ulrici, is now presided over by Dr. Richard Falckenberg, of Erlangen. It has reached its hundredth volume, and with the present two numbers begins a new series. Its reviews

and lists of newly published works are comparatively complete. Its articles, though generally tinged with scholasticism and chiefly treating of philosophico-historical subjects, deal, nevertheless, with some modern and living questions; for example, Dr. Max Schasler's discussion of the proceedings on the recent Prussian school law; Dr. Eugene Dreher's consideration of the law of the conservation of force; and Dr. Nikolaus von Seeland's discussion of the deficiencies of the current theory of force The other articles are contributed by A. Wreschner, G. Frege, J. Zahlfleisch, and Robert Schellwien. (Leipsic: C. E. M. Pfeffer.) μκρκ.

THE AMERICAN JOURNAL OF PSYCHOLOGY. August, 1892. Vol. IV. No. 4.

CONTENTS:

THE EXTENT OF THE CORTEX IN MAN, AS DEDUCED FROM THE STUDY OF LAURA BRIDGMAN'S BRAIN. By *Henry H. Donaldson.*

SOME INFLUENCES WHICH AFFECT THE RAPIDITY OF VOLUNTARY MOVEMENTS. By *F. B. Dresslar.*

EXPERIMENTAL RESEARCH UPON THE PHENOMENA OF ATTENTION. By *James R. Angell* and *Arthur H. Pierce.*

SOME EFFECTS OF CONTRAST. By *A. Kirschmann.*

REPORT ON AN EXPERIMENTAL TEST OF MUSICAL EXPRESSIVENESS. By *Benjamin Ives Gilman.*

PSYCHOLOGICAL LITERATURE. (Worcester, Mass.: Clark University.)

MIND. New Series. No. 3. July, 1892.

CONTENTS:

LOTZE'S ANTITHESIS BETWEEN THOUGHT AND THINGS. (I.) By *A. Eastwood*

THE FESTAL ORIGIN OF HUMAN SPEECH. By *J. Donovan.*

THE LOGICAL CALCULUS. (III.) By *W. E. Johnson.*

THE FIELD OF ÆSTHETICS PSYCHOLOGICALLY CONSIDERED. (I.) By *H. R Marshall.*

DISCUSSIONS: The Influence of Muscular States on Consciousness. By *Edmund B. Delabarre.* Dr. Münsterberg and his Critics. By *E. B. Titchener.* The Definition of Desire. By *Henry Rutgers Marshall.* Feeling, Belief, and Judgment. By *J. Mark Baldwin.*

CRITICAL NOTICES. (London: Williams & Norgate.)

INTERNATIONAL JOURNAL OF ETHICS. July, 1892. Vol. II. No. 4.

CONTENTS:

NATURAL SELECTION IN MORALS. By *S. Alexander.*

WHAT SHOULD BE THE ATTITUDE OF THE PULPIT TO THE LABOR PROBLEM? By *W. L. Sheldon.*

ETHICS OF THE JEWISH QUESTION. By *Charles Zeublin.*

MACHIAVELLI'S PRINCE. By *W. R. Thayer.*

ON THE FOUNDING OF A NEW RELIGION. By *B. Carneri.*

AN ANALYSIS OF THE IDEA OF OBLIGATION. By *Frank Chapman Sharp.*

REVIEWS.

Prof. S. Alexander, in his lecture delivered before the Ethical Societies of Cambridge and London, here reproduced, points out that the growth and change of moral and social ideals are the result of a process of mental conflict. Professor Sheldon thinks only a partial solution of the labor problem is possible until the second coming of men somewhat of the type of St. Francis of Assisi, "who will sacrifice their personal opportunities, abandon their station in the world, and go down to apply their gifts and acquirements to the cause of the lower stratum of society." The religious as well as economic opposition to Judaism, according to Mr. Charles Zeublin, is caused by the exclusiveness of the Jew, and his ultimate welfare and that of his neighbors requires a humanitarian treatment within and without Judaism. Mr. William R. Thayer shows that Machiavelli merely described things as they were in his time, and deduced the laws which actually controlled the public deeds of rulers; and that it is now "the duty of all men to sweep away the old falsehood that rulers and governments are absolved from paying heed to those ethical principles to which every individual is bound." According to Mr. B. Carneri, the living at peace with oneself and one's fellowmen is possible only without religion, "because there is no morality without contentment, and it is the highest degree of discontent to strive for something beyond this world." Mr. Frank Chapman Sharp concludes that when the element of *the good* is taken out of the conception of obligation, this degenerates into mere submission to an arbitrary imperative; the foundation for the distinction between right and wrong must be sought in something that appeals to us as good, and its ultimate criterion can be given only by our chosen ideal. (Philadelphia: *International Journal of Ethics*, 118 S Twelfth Street.) Ω.

THE PHILOSOPHICAL REVIEW. July, 1892. Vol. I. No. 4.

INHIBITION AND FREEDOM OF THE WILL. By *Dr. James H. Hyslop.*
A CLASSIFICATION OF CASES OF ASSOCIATION. By *Mary W. Calkins.*
THE ORIGIN OF PLEASURE AND PAIN. By *Dr. Herbert Nichols.*
ON PRIMITIVE CONSCIOUSNESS. By *Hiram M. Stanley.*
REVIEWS OF BOOKS.
SUMMARIES OF ARTICLES.

The confusion incident to the old controversy about freedom is due, says Dr. James H. Hyslop, to a failure to distinguish between the *proof* of freedom and the *conditions* of it, that is, "the circumstances that are necessary to it, or the characteristics that constitute it." Freedom consists in "self-initiative and independence of external causes, whether there be any choice between alternatives or not," and inhibition and deliberation bring about both of these circumstances. Miss Mary W. Calkins rejects the ordinary division into association by contiguity and association by similarity, and gives detailed summaries of the fundamental characteristics of consciousness on which association depends and of the characteristics of association proper; the ultimate fact of association, whether it be psychical or physical or both, we do not understand. Dr. Herbert Nichols, in the first part of his article on the "Origin of Pleasure and Pain," considers the phenomena of pleasure and pain associated with the action of the senses, and concludes that there is no "tangible evidence indicating that pleasures and pains are inseparable attributes of other senses or polar complements of each other," and that separate sensations of pain and of pleasure are probable. Mr. Hiram M. Stanley regards pure pain as primitive mind, and pleasure as the polar opposite to it, although they are neither abso-

lutely essential one to the other, pleasure being traced to "an intermediary feeling between pain as produced by excess, and pain from lack as differentiated form." Consciousness is fundamentally pain and pleasure as serving the organism in the struggle for existence. (Boston, New York, Chicago: Ginn & Company.) Ω.

THE NEW WORLD.

CONTENTS: Vol. I. No. 2.

THE SOCIAL PLAINT. By *E. Benjamin Andrews.*
RELIGIOUS EVOLUTION. By *Minot J. Savage.*
THE ORIGIN AND MEANING OF THE STORY OF SODOM. By *T. K. Cheyne.*
THE FOUNDATION OF BUDDHISM. By *Maurice Bloomfield.*
IMAGINATION IN RELIGION. By *Francis Tiffany.*
THE NEXT STEP IN CHRISTIANITY. By *S. D. McConnell.*
THE IMPLICATIONS OF SELF-CONSCIOUSNESS. By *Josiah Royce.*
HOW I CAME INTO CHRISTIANITY. By *Nobuta Kishimoto.*
NEW FORMS OF CHRISTIAN EDUCATION. By *Mrs. Humphry Ward.*

CONTENTS: Vol. I. No. 3.

THE ESSENCE OF CHRISTIANITY. By *Otto Pfleiderer.*
ECCLESIASTICAL IMPEDIMENTA. By *J. Macbride Sterrett.*
NEW TESTAMENT CRITICISM AND RELIGIOUS BELIEF. By *Orello Cone.*
THOMAS PAINE. By *John W. Chadwick.*
SOCIAL BETTERMENT. By *Nicholas P. Gilman.*
THE RÔLE OF THE HISTORY OF RELIGIONS IN MODERN RELIGIOUS EDUCATION By *Jean Réville.*
A POET OF HIS CENTURY. By *E. Cavazza.*
DIVINE LOVE AND INTELLIGENCE. By *James C. Parsons.*
BOOK REVIEWS.
SUMMARIES OF ARTICLES. (Boston: Houghton, Mifflin, & Company.)

REVUE PHILOSOPHIQUE.

CONTENTS: June, 1892. No. 198.

EXISTENCE ET DÉVELOPPEMENT DE LA VOLONTÉ. I. Existence de la Volonté. By *A. Fouillée.*
SUR QUELQUES IDÉES DU BARON D'HOLBACH. By *A. Lalande.*
ESSAI SUR LA PHILOSOPHIE DE PROUDHON. By *G. Sorel.*
TRAVAUX DU LABORATOIRE DE PSYCHOLOGIE PHYSIOLOGIQUE.

CONTENTS: July, 1892. No. 199.

L'INCONNAISSABLE DANS LA PHILOSOPHIE MODERNE. By *G. Fonsegrive.*
LA MUSIQUE D'APRÈS HERBERT SPENCER. By *J. Combarieu.*
ESSAI SUR LA PHILOSOPHIE DE PROUDHON (concluded). By *G. Sorel.*

CONTENTS: August, 1892. No. 200.

ÉTUDE CRITIQUE SUR LE MYSTICISME MODERNE. By *Rosenbach.*
LE DÉVELOPPEMENT DE LA VOLONTÉ. By *A. Fouillée.*
LA BEAUTÉ ORGANIQUE: ÉTUDE D'ANALYSE ESTHÉTIQUE. By *A. Naville.*
ANALYSES ET COMPTES RENDUS.

According to M. Fouillée, the principle which tends to dominate psychology and physiology is the ubiquity of will and of feeling, and consequently of conscious-

ness. Psychology will end by recognising the continuity and the transformation of modes of psychical energy, as physics recognises the continuity and the transformation of modes of physical energy, and philosophy will see in physical energy the external expression of will.

M. Fonsegrive maintains that the rejection of metaphysics as science, which marks the modern theory of the unknowable, is the consequence of Kant's *a priori* theory as to the origin of our knowledge. The laws of the mind have no real existence prior to experience, and universal and necessary notions can be discovered only by mental analysis. In this manner the existence, and even the essence, of metaphysical beings may be known, but only of such as experience puts in communication with ourselves. Thus we know God as the necessary first cause, although our notion of God is one of negation, of experimental notions.

After showing that Spencer's theory of music had numerous antecedents, and that its conclusions are unacceptable on various grounds, M. Combarieu, affirms that the secret of the musical art is the identity of the musical idea with the imitation or expression of the real world. All music contains a double verity ; it is the meeting place of the senses and of the rational world confounded in a unity which is the work of art, as man is the combination of a soul and a body confounded in the real unity of life. Spencer is an excessive simplifier, and does not see the complexity of certain questions, which he seeks to resolve by undervaluing them. But he has thrown light on one of the aspects of the musical problem.

In this final essay on the philosophy of Proudhon, M. Sorel considers the theory of justice by the light of the notion of free will. He differs somewhat from Proudhon, and affirms that "the just man is the upright man such as our ideal conception of antiquity represents him to us, but transformed by our consciousness as refined by the influence of Christianity." In dealing with the real organisation of societies it is necessary to distinguish between matters of justice and those of right, which includes that of force, of which war is an application. After showing the connection of the economic *contradictions* of Proudhon with the state of war, and the value of education for the realisation of equilibrium in the state, M. Sorel affirms that education ought to be based on manual labor, for the explanation of which science should be taught ; and that instruction should endure throughout life, so that men can elevate themselves and that an equilibrium may be obtained between knowledge and industrial needs. (Paris : Félix-Alcan.) Ω.

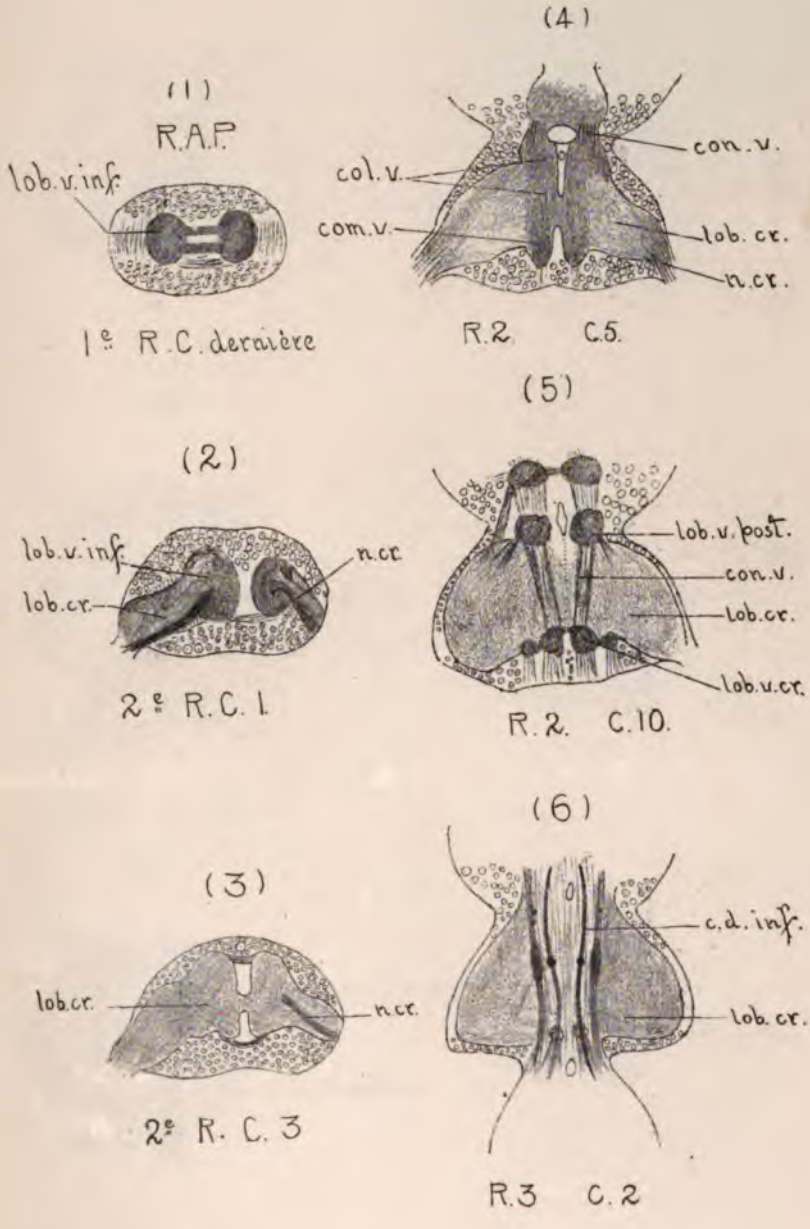
APPENDIX.

PLATES BELONGING TO THE ARTICLE "THE NERVOUS GANGLIA OF INSECTS."

KEY TO THE PLATES.

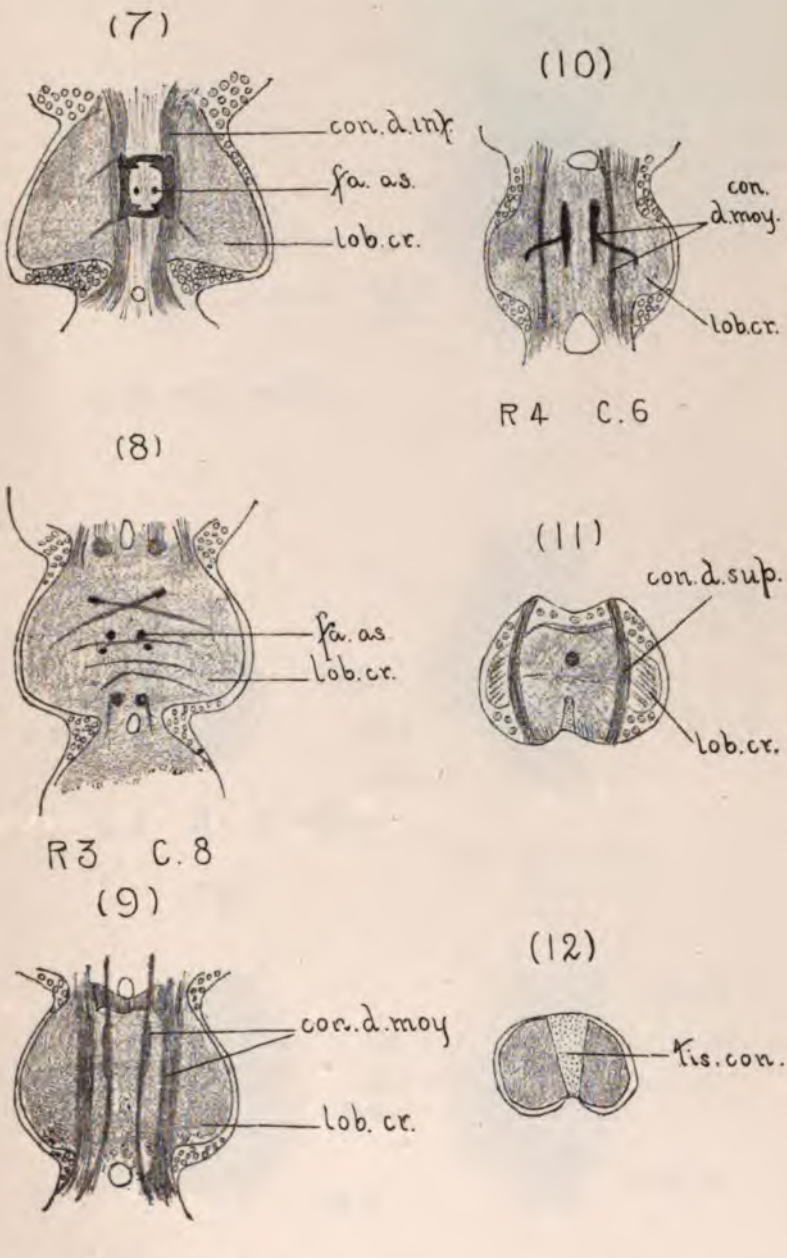
col. ven.—ventral column.
lob. dors.—dorsal lobe.
lob. ven.—ventral lobe.
lob. v. inf.—inferior or lower ventral lobule.
lob. cr.—crural lobule.
con. dors. sup.—superior (or upper) dorsal connective filaments.
con. dors. moy.—medial dorsal connective filaments.
con. dors. inf.—inferior (or lower) dorsal connective filaments.
con. v.—ventral connective filaments.
n. cr.—crural nerve.
n. al.—alary nerve.
lob. al.—alary lobule.
rac. sup.—upper (or superior) root.
rac. moy.—medial root.
rac. inf.—lower (or inferior) root.
fa. as.—ascending fasciculus.

PLATE I.



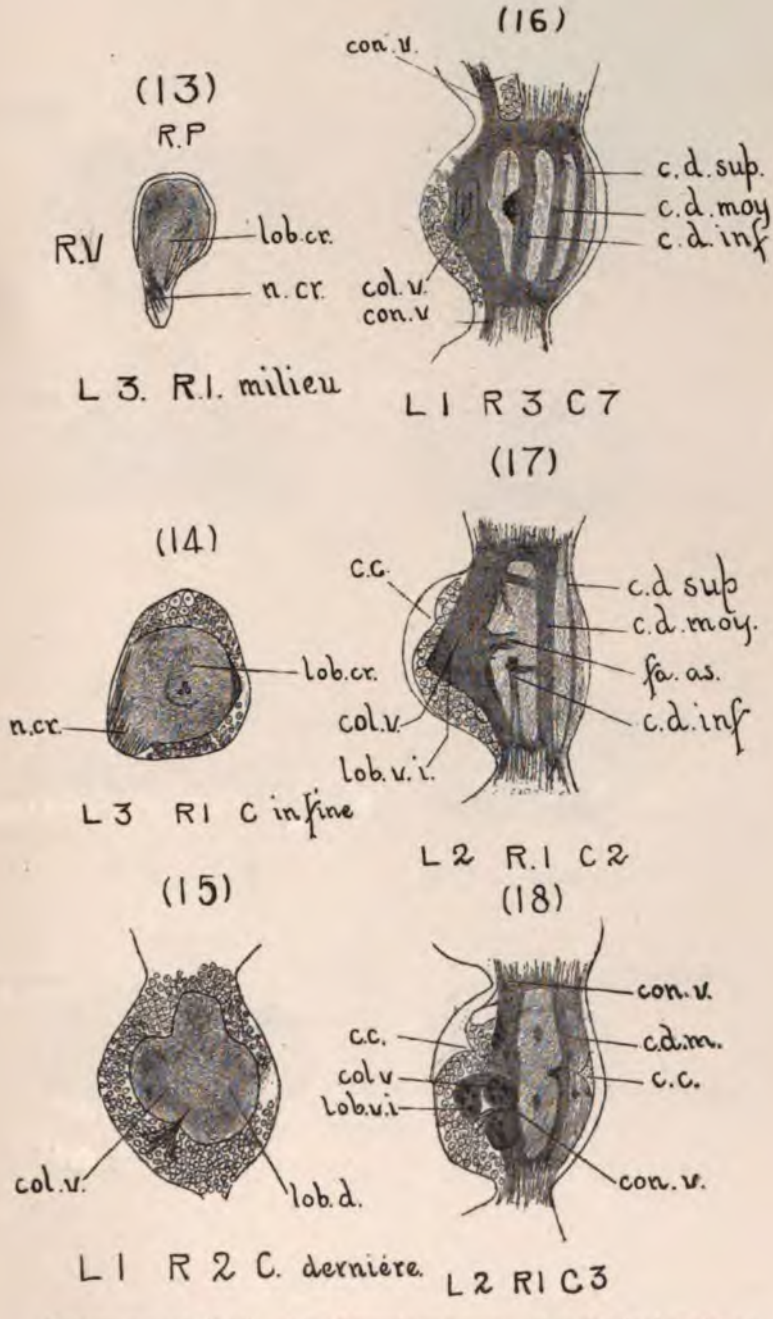
Rhizotrogus solstitialis. First thoracic ganglion. (Horizontal sections.)

PLATE II.



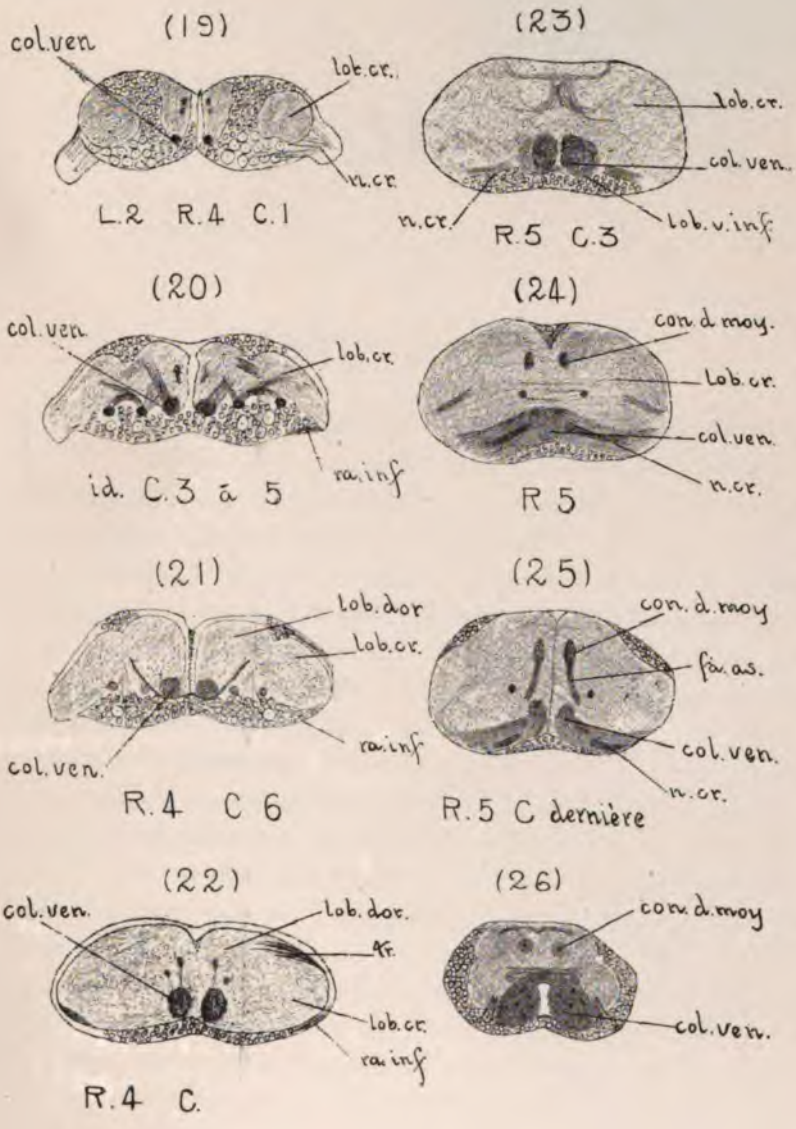
Rhizotrogus solstitialis. First thoracic ganglion. (Horizontal sections.)

PLATE III.



Rhizotrogus solstitialis. First thoracic ganglion. (Longitudinal sections.)

PLATE IV.



Rhizotrogus solstitialis. First thoracic ganglion. (Transversal sections.)

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THE MONIST.

THE DOCTRINE OF AUTA.

IN the "Scientific Proceedings of the Royal Dublin Society" (Vol. VI, Part IX, p. 475, 1890), Dr. Johnstone Stoney, F. R. S., published an interesting and carefully-reasoned paper "On the Relation between Natural Science and Ontology." The same author had previously (1885), in a Friday evening discourse at the Royal Institution of London, discussed the problem, "How Thought Presents Itself Among the Phenomena of Nature." Dr. Stoney's communications have not (I venture to think) received the consideration to which they are entitled alike on the score of their logical consistency, if his premisses and assumptions be granted, and by reason of the author's scientific eminence as a physicist. I therefore propose, first, to endeavor to set forth his monistic *Doctrine of Auta*; and secondly, to offer some criticisms thereon. Unfortunately Dr. Stoney's pages bristle with new technical terms, which, though no doubt they have been serviceable to him in the attainment of precision of thought, make his paper hard reading. Some of these I shall introduce; others which seem less essential to the argument I shall omit. It would be scarcely fair on the reader's teeth or on the author's store to transfer all these hard nuts from Dublin to Chicago.

No philosophical discussion of a problem involving perception can be regarded as complete without the introduction of an orange. Dr. Stoney, indeed, substitutes a fire; but this, though it shows philosophical independence, cannot for a moment be sanctioned by

any good Berkeleyan. An orange then, as such, is a phenomenal object formed, in a way we need not now consider, by the synthesis of perceptions. These perceptions, themselves synthetic, Dr. Stoney calls "tekmeria," since they are signs within my mind that events are happening in a part of the universe that is distinct from my mind. The phenomenal object is supposed by men untrained in inquiries relating to the mind to have a non-egoistic existence—that is, an existence independent of the percipient mind. But this supposition is found on careful scrutiny to be an error. It is a product of mental synthesis, and is therefore termed by Dr. Stoney a "syntheton." It is also termed a "protheton" in contradistinction to an "antitheton," which we shall come to shortly.

Now if the phenomenal orange is a "syntheton"—that is, a product of perceptual synthesis—it clearly cannot be regarded as the *cause* of the perceptions, through and by means of which it is constructed in mental synthesis. Here popular thought and ordinary language are apt to mislead us. For ordinary language is throughout built upon the popular belief that the objects of the phenomenal world are non-egoistic or independent *existences*, and, moreover, that they are the cause of the perceptions which come into existence when we exercise our senses. This is, however, "to put the car before the horse." It is to imagine that a structure built up out of the effects of a thing can be the cause of those effects. The phenomenal orange is built up of perceptions instead of being the cause of them. Their cause is therefore to be sought elsewhere than in the phenomenal world of objects. The orange, *qud* orange, is therefore a "syntheton," and cannot as such be the cause of the perceptions or "tekmeria," which go to its synthesis.

Let us now look at these perceptions or "tekmeria" from another point of view. They are states of consciousness: they are *thoughts*, if we use this word in its widest extension to embrace everything of which I or my fellow-men or the lower animals are conscious. But my own thoughts are, so long as they last, things that exist. They may be representative of something outside me, but they *are* also *real existences*. While they last they constitute a part of the universe of existing things. They are, in Dr. Stoney's

terminology, *auta* (*τὰ ὄντα αὐτά*), the very things themselves. An *auto* (we shall throughout *italicise* all that belongs to this autic order of existence) is a *thing which really exists*, and in no wise depends on the way we, human minds, may happen to regard it. Our impressions or beliefs about it may be correct or may be erroneous; but the term *auto* means the *thing itself*.

Perceptions, then, inasmuch as they are thoughts, are *auta*. They belong, moreover, to that class of real existences which, since they are woven into the tissue of *minds* (my mind and the minds of my fellow-men and of the lower animals) are termed *egoistic auta*. They do not remain, however, persistent and unchanged; for perceptions come and go and are modified as they pass like waves over the surface of consciousness. What causes this coming and going, and these changes in the *egoistic auta* we call perceptions? Not, as we have already seen, the world of phenomenal objects! What then, but other *auta*, which, since they produce effects upon men's minds through their senses, may be termed *sense-compelling auta*? The phenomenal orange is thus a "syntheton" produced through a synthesis of the effects wrought upon my *mind* by an autic existence, called by Mr. Stoney the *onto-orange*. The phenomenal orange is, as we have seen, a "protheton"; the *onto-orange* is its *antitheton* in the universe of real existences.

We are now beginning to open up Dr. Johnstone Stoney's conception of the relation of the autic *universe* to phenomenal Nature. Nature is the totality of phenomenal objects; but corresponding with each phenomenal object or "protheton" there is an *onto-object* or *antitheton*; and the totality of *antitheta* constitute the *universe*. *Minds*, mine and those of other beings, constitute the egoistic part of the universe; the rest of the universe is constituted by *sense-compelling auta*.

We may liken the *sense-compelling universe* to a great machine in motion, and the *tekmeria* or perceptions which it produces within our minds to shadows cast by it. The laws of the movements of the machine are the real laws of the universe—laws of nature are but the laws of the changes which the shadows in consequence undergo. It is these shadow laws alone which natural science can

reach: the real laws of the *universe* of which these are shadows are beyond its grasp. In Nature the reflective eye of science sees not only phenomenal objects, but the relations which they bear to each other. But such relations are themselves phenomenal; they are protheta of which the *onto-relations* of the real *universe* are the *antitheta*. Every space-relation, therefore, in Nature—for instance, that my foot is at present three yards from the fender—has a real autic relation in the sense-compelling *universe*, which is its *antitheton*; an *onto-relation* between the *onto-foot* and *onto-fender*, meaning by these terms the *auta* which send men the tekmeria which, when synthesised, furnish these two phenomenal objects. The space-relations of Nature are but the shadows cast by the *autic relations* within the *minds* of men, and perhaps some other animals.

But among these shadows there can be no efficient causation. When a change takes place in the sense-compelling *universe*, the mighty machine will cast one shadow before the change and another after. The second shadow will accordingly succeed the first in orderly sequence, but the relation between the shadows is not the relation of cause and effect. Accordingly, in the laws of Nature which have been discovered by scientific investigation, we find abundant instances of unfailingly concomitant events and of uniformities of sequence, but not one single instance of cause and effect. There is nothing competent to cause one body to exclude another from the space it occupies. A statement of the fact is one of the laws of Nature. If a stone be allowed to drop in the vicinity of the earth, its downward speed is accelerated by a perfectly definite law. This law is one of the Uniformities of Nature which scientific inquiry has brought to light. But within the domain of Physics there is no cause of acceleration. The facts as to what occurs in Nature can be observed; the circumstances under which they occur can be investigated; similar cases can be compared; and the laws to which the simultaneous or successive events conform may be brought to light. But here our knowledge ends. Physical science has said its utmost.

Now all this is changed when we turn to the only field of observation accessible to us in which we are dealing directly with *auta*.

The *thoughts* of which *I* consist, the thoughts which are my *mind*, are *auta;* a very small group of *auta*, no doubt, in the mighty *Universe*, but still an actual sample, though a very special and one-sided sample of what *auta* really are. Now in the operations that go on in my mind I do find instances, some few instances, of causes producing effects. The familiar case of a geometrical demonstration producing in a man's mind a belief in the truth of the conclusion is a case in point. Here the understanding of the proof is the efficient cause of the belief in the conclusion which accompanies that understanding. A wish to accomplish something, and a knowledge of how to go about it, both of which are *thoughts* in the *mind*, are a part of the efficient cause of subsequent events, unless counteracted by other causes. A few other examples can be obtained from the same small field of observation; and this is all that man, in his isolated position, has any right to expect; for the bulk of his thoughts are due, at least in large part, to autic causes which lie outside his mind, and it is there also that those of his thoughts that are known to be causes, usually exhibit their effects. When perceptions arise in my mind, the effect indeed is within my mind, but the cause is beyond it; and when I move my muscles the cause is within my mind, but it is outside the mind that it operates. The instances are indeed few where the causes and the effects are both within my tiny group of *auta*, and it is only in these cases that I can have the process of causes producing effects under my inspection.

But since cases can be cited, however few, they suffice to establish the fact that the relation of cause and effect, in its full sense, does exist in some instances in the autic *universe*; whereas it has nowhere any place within the domain of physical science. The relation of cause and effect among other *auta* cannot from the nature of the case be proved. But from its occurrence in that small part of the *universe* which we do know, we may fairly assume its occurrence in all parts of that *universe*. Such an assumption is at any rate justifiable by scientific method.

We must now pass to another point. The scientific analysis of Nature by the physicist has led to an hypothesis which may be regarded as the utmost simplification of which the shadows cast within

the human mind by the sense-compelling autic *universe* are susceptible. This Dr. Stoney calls the Diacrinomenal Hypothesis; according to which Nature is made up of objects each of which consists of almost inconceivably minute and swift motions. The phenomenal orange is a group of molecular motions; and if I bowl it across the table the visible molar motion is a secondary motion of that group of primary molecular motions which constitutes the phenomenal object as such. And not only is the phenomenal object a group of minute and swift motions, but all the steps between that object and our brain, all that takes place in the air or æther, in our organs of sense and nerves, can also be represented in terms of motion. And finally a change consisting of motions takes place in the brain itself, whereupon we become conscious of thought. That change which would be appreciated as motions by a bystander who could search into our brains while we are thinking, we should experience to be *thought*. Thus we find that in certain cases the *autic existence* that corresponds with motion, namely in the motions of our own brain molecules, is *thought*. And the most probable hypothesis as to the true relation of phenomenal Nature and the autic *universe* is that what we have found to be true in some cases is always true, and that in every case it is *thought* (or rather a change in the causal relation in which thought stands to thought) which is the *antitheton* of motion; so that the totality of all actual existences, the *universe*, is in fact identical with the totality of existing *thought*. Of course all this *thought*, with the exception of that tiny group that is my *mind*, is as much outside my consciousness as are the thoughts of my fellow-men and of the lower animals.

Under this view the *minds* of men and of other animals are specialised specks, as it were, of a vast ocean of *thought*, to which they bear a like inconspicuous proportion to that borne by the few brain motions of which they are the *antitheta*, to the totality of motions throughout Nature. Under this view the laws of the *universe* are the laws of *thought*. This is a very different thing, be it noted, from saying that they are the laws of human thought. The laws of human thought bear to them the same small proportion which the laws of the action of the wheels of a watch upon one another bear to the

entire science of dynamics. The science of dynamics could never be evolved from a study of these laws. But perhaps it may not be hopeless for man to attain some sound knowledge of the laws of cosmic *thought*, inasmuch as we have some few instances of the way *thought* acts upon *thought* open to our investigation in our own minds, and since this is supplemented by our knowledge of the physical laws of nature, which are a shadow, a probably complete shadow, of all the laws of causation which operate throughout the *universe*, throughout the all-embracing *Mind* of the great *Autos*.

Such is Dr. Johnstone Stoney's conception of the relation of Natural Science to Ontology. I have presented it partly in his own words, partly in mine. It has been my conscientious endeavor to put it in as strong and favorable a light as possible, and not in any way to weaken the strength of its logical consistency. The main thesis may now be briefly summarised in the following propositions:

The phenomenal object is a syntheton or product of mental synthesis.

Its efficient cause is a *real existence* or *antitheton*.

Nature is the totality of phenomenal syntheta.

The *universe* is the totality of autic *antitheta*.

There is no causation in Nature; but the Uniformities of Nature are the shadows of the causal Laws of the Universe.

Thought has no place in Nature: it is part of the autic *universe*.

The syntheton of which *thought* is the *antitheton* is the motion of brain molecules.

It is a probable hypothesis that the *antitheta* of which the motions of Diacrinomenal Nature are the syntheta, are *thought*.

This is the monistic hypothesis, that there is but one kind of existing thing, viz. *thought;* in contradistinction to the dualistic hypothesis that there are two kinds of existing things, *thought* and *motion*.

I now pass from the attitude of expositor to the attitude of critic. And first I will attack a quite outstanding position, namely Dr.

Stoney's assumption that Clifford's hypothesis which he supports and extends is *the* monistic hypothesis, and by implication that it is the *only* monistic hypothesis. In opposition to this I venture to affirm that there are several forms or phases of monism. I have not space to discuss the matter; and must content myself with a bare enumeration of some of the logically possible forms of Dualism and of Monism.

1) DUALISM.

A. Synthetic Dualism: according to which there are two entities, the mind and the body; and these

a) either work side by side, without interaction, in pre-established harmony (*philosophic dualism*),

b) or interact the one on the other (*empirical dualism*).

B. Analytic Dualism: according to which there are two elements as the result of analysis; *motion* (with or without a material basis) and *consciousness;* the two elements being related in such a way that conciousness is inseparably associated with certain complex modes of motion.

2) MONISM.

A. Synthetic monism: according to which there is but one entity. And this entity may be:

a) The body, of which consciousness is a product (*materialistic or physical monism*);

b) The mind, of which the body in common with the world of phenomena is a fiction (*idealistic monism*);

c) The conscious organism, exhibiting certain transformations of energy which are felt as psychical states (*scientific monism*).

B. Analytic monism: according to which analysis discloses but one element; and this may be

a) *motion*, of which (or of one phase of which) consciousness is merely the psychical aspect (*analytic materialism*);

b) *consciousness*, of which motion is merely the phenomenal aspect (*analytic psychism*);

c) *x* (*the unknowable*) of which motion is the physical aspect and consciousness the psychical aspect (*monistic agnosticism*).

Such are some of the forms or phases of monism as compared with those of dualism. It will be seen that Dr. Johnstone Stoney's speculations fall under the head of what I have termed analytic psychism, according to which the sole ultimate reality disclosed by analysis is consciousness or thought. So far I have only reminded my readers that this, though one form of monism, is not the only form. To which Dr. Stoney may very possibly reply that it matters not to him whether there are five or fifty-and-five monistic heresies besides the true creed of which he is the prophet. He is only concerned with the establishment of the true monistic faith. And as herein I should very heartily agree with him, I will pass on without delay to criticise an assumption that lies close to the heart and centre of his hypothesis.

On the first page of Dr. Stoney's essay we read: "Let us, for convenience, call these real existences *auta*—the very things themselves. An *auto* is a thing that really exists, and in no wise depends on the way we, human minds, may happen to regard it." And on the second page we read: "My own thoughts are, at all events, things that exist: they at least are *auta* so long as they last. They are, accordingly, while they last, a part of the *universe of existing things*." No proof is offered of this latter assumption that my thought, human thought, is part of the universe of *auta*. I venture to call this assumption in question. I demand proof of its validity. Nay, I am ready to go further and roundly assert that my thoughts are not *auta*, and furnish no evidence whatever as to the nature of such *auta*. I am quite aware that I may seem to be giving the lie to a direct deliverance of consciousness; and that it will be said that it is obviously impossible to deny the existence of thought without at the same time exercising that, the existence of which is denied—a dictum which contains a very pretty play upon two different uses of the word "existence."

I go back to the orange, without which as a philosopher I am lost. I hold it in my hand, look steadfastly at it, and drink in with my nostrils its fragrant aroma. What says consciousness? That the phenomenal object I call an orange exists. It says nothing about independent existence, nothing about *auta*. The direct de-

liverance of consciousness is that an object-in-consciousness exists. If a "plain man" says that the orange has a real existence, as such, independent of consciousness, he is going beyond the direct deliverance. And if a philosopher says that consciousness has a real existence, as such, independent of the object, he too is going beyond the direct deliverance. And if, as would seem to be the case, Dr. Stoney relies on the deliverance of consciousness for the justification of his statement that "perceptions, while they last, are *auta*, real existences," I submit that he is relying on a misinterpretation of the deliverance of consciousness.

The existence of the object-in-consciousness is the datum from which plain man and philosopher alike must start. On this foundation we must base all our reasonings and speculations. Physical science directs its attention to the "object" side of the given relation. And it reaches its "diacrinomenal" result that the orange may for physical purposes be represented as a group of swift and rapid molecular motions. But can physics at any stage of its analysis shake itself free from the "consciousness" side of the relation? Assuredly not. All that it can do is to represent the object-in-consciousness we call an orange in terms of other objects-in-consciousness we term molecular motions. Psychology directs its attention to the "consciousness" side of the given relation. It analyses the object-in-consciousness into percepts, sensations, and so forth. But can psychology at any stage of its analysis shake itself free from the "object" side of the relation? Assuredly not. All that it can do is to represent the consciousness-of-the-object we call an orange, in terms of the objects-in-consciousness we term sensations, relations between sensations, and so forth.

The relation of the consciousness-of-an-object to the object-in-consciousness may be made clear by the analogy, which is something more than an analogy of vision and the visual field. For clear and distinct vision, a well-illuminated object of vision, and a healthy organ of vision are necessary as coöperating factors. So, too, for distinct consciousness a definite object-in-consciousness and a well-defined consciousness-of-the-object are necessary as coöperating factors. More than this. Unless there be some object of vision, how

ever vague, and some organ of vision, however dim, no vision at all is possible. The coöperation of the two factors is essential. So, too, unless there be some object-in-consciousness, however vague, and some consciousness-of-the-object, however dim, no consciousness at all, in anything like the human sense of the word "consciousness," is possible. Here, again, the coöperation of the two factors is essential. *And neither factor is ever given in experience without the other.*

Writing as I am, for readers of *The Monist*, I need hardly turn aside to explain what I mean by an object-in-consciousness. And yet perhaps a few words on the subject may not be out of place, and may prevent possible misunderstanding. An object-in-consciousness is not necessarily a tangible, visible object, like an orange. The yellowness, the sweetness, the weight, the bare existence of the orange, may each in turn be an object in consciousness. For the physicist the tangible orange may be represented in terms of swift, infinitesimal motions; and these, not less than the phenomenal orange, are objects in consciousness. A conception of consciousness itself, an imperfect conception, but the best we can frame, may be an object of consciousness, just as a reflected image of the eye may be to the eye an object of vision.

It is generally believed by modern psychologists that all objects-in-consciousness are derivable by processes of abstraction, generalisation, and so forth, from the primitive datum of a perceptual object. And it must be remembered that it is only in abstraction that we distinguish between the object-in-consciousness and the consciousness-of-the-object. The two terms of this, for us, inevitable relation are given in inseparable coördination. But in abstract thought we can distinguish the inseparable terms; distinguish in thought, that is to say, what is inseparable in actual experience. To continue the analogy of vision, we can make the one term focal, while the other term remains marginal in the field of view. And we can neglect, for the purposes of our thought and reason, the marginal term. But we cannot get rid of it. We may deal, as in physics, with motion, neglecting the consciousness in and through which it is appreciated; but we cannot get rid of this consciousness.

Or we can deal, as in psychology, with the consciousness, neglecting the object-in-consciousness; but we cannot get rid of this object. The object-out-of-consciousness and the consciousness-without-an-object are alike unknown—or, if the reader prefers it, unknowable, which he may write with as many capital letters as seemeth to him good. The common-sense realist believes in the existence of objects-out-of-consciousness. The analytical psychist believes in the existence of consciousness-without-an-object. Both are, if the views here advocated be sound, attributing independent existence to that which, so far as human knowledge is concerned, has only dependent or relative existence.

It is unfortunate that the terms "real" and "reality" should ever have been applied to the independent existence of so-called things-in-themselves. I think such terms as Dr. Stoney's "autic" and "autic existence" would be far preferable. For the word "real" has a meaning and force which is quite definite. The orange that I hold in my hand and see with my eyes is as real as real can be. And if a philosopher steps in and says, "My dear sir, *that* is not real! The real reality is, according to some, mind-stuff or consciousness; according to others, motion of—well I don't quite know what, so let us simply call it motion; and according to others this real reality is unknowable"—I say if a philosopher steps in and talks like this, one is reminded of Lamb's remark on Coleridge. Coleridge had been maundering on, as was his wont, on "subject" and "object" and all the rest of his second-hand German metaphysics, when Lamb broke in, with his forcible stammer, in a stage whisper: "N-n-n-never mind C-c-c-coleridge; it's only his f-f-f-fun."

I repeat that the orange I hold in my hand and see with my eyes is as real as real can be; and that we have here the standard and criterion of reality not only for plain men but for philosophers. In the perceptual object we have reality given in its clearest, fullest, and most forcible form. Every step in the analysis of the perceptual object-in-consciousness; every step in the analysis of the consciousness-of-the-object takes us so far further from reality at its best. The orange as an object-in-consciousness is far more real to me than either the swift infinitesimal motions of the physicist, or the "syn-

theton" of related and integrated sensations of the psychologist. And when we reach the autic existence which is supposed to underlie both motion and consciousness, we seem to get just as far as it is possible for the human mind to get from the real orange with which we started. And yet it is to this autic existence that metaphysicians apply the term "real" in a different sense. For so far I have used the word "real" for that which is given in experience. But metaphysically the word "real" is used to indicate independence of experience. I repeat that for this independent existence some such word as Dr. Stoney's "autic" would be far better and less misleading. It would emphasise the distinction between *real*, that is to say given in direct experience, and *autic*, that is to say independent of experience.

Accepting at any rate for our present purpose this distinction, we have as coördinate realities the object-in-consciousness and the consciousness-of-the-object. And these two are only different aspects of the one great reality, the reality of experience. Of these two aspects neither is more real than the other. The object-in-consciousness is every bit as real as the consciousness-of-the-object; the orange as real as our perception thereof. Both are intensely and vitally real; but—here I am in opposition to Dr. Stoney—*neither is autic*. I can find no warranty for such autic existence in direct experience or the so-called deliverance of consciousness. Nor am I aware of any process of reasoning by which it can be demonstrated.

But, it may be said, is it not in accordance with scientific method to make an assumption and then see how far such assumption is justified by the results it enables us to reach? Assuredly such procedure is allowable and often fruitful. It is not on such grounds, however, that Dr. Stoney, if I rightly understand him, bases his doctrine of the psychical nature of *auta*. Let us, nevertheless, pay a moment's attention to this assumption and the correlative assumption of analytic materialism. Consciousness and matter-in-motion (or bare motion perhaps) are the ultimate elements reached by the psychologist on the one hand and the physicist on the other. Neither, if he knows his business, pretends by this analysis to have reached autic existence. But it is open to each to make an assumption. The

materialist says: I assume that motion is the true autic existence, of which, under appropriate conditions, human consciousness is merely a psychical aspect. The psychist says: I assume that consciousness is the true autic existence, of which motion is merely the phenomenal aspect. I confess that if I were forced to choose one of these two, (which fortunately I am not,) I should elect to throw in my lot with the materialists. For if justification by results is to be the criterion, I hold that the results the materialists have to show far outweigh any results which the analytic psychists can produce. But the fact of the matter is that in neither case do the results flow from the autic assumption. All the results are equally valid for the student who holds fast to the relativity of object-in-consciousness to consciousness-of-the-object. Since therefore the assumption is valueless so far as practical results are concerned, and since it is somewhat repugnant to sound reason to assume that either term of a given relationship is the same out of relationship as it is in relation to its fellow, I contend, as against both materialist and psychist, that it fails to make good its claim to acceptance.

What shall we say then of *auta* or *things in themselves?* Simply that we do not know anything about them—that they are outside the pale of human knowledge. If we even say they exist we are using the word "exist" in an autic and unreal sense. It is phenomenal Nature which constitutes the real Universe; of its autic *shadow*, supposing that there be such a *shadow*, we know nothing. Need we then stay to criticise this unknown *shadow*?

Even if we take Dr. Johnstone Stoney's hypothesis as it stands we find a marked distinction between the sense-compelling *auta* and the egoistic *auta*, or between the sense-compelling aspect of *auta* and the egoistic or perceptive aspect. How is this distinction to be explained and accounted for? I can see no answer to this question save that the distinction is a matter of experience. Why not, then, trust experience fully? Why go beyond it at all? Why not say that both the sense-compelling aspect and the perceptive aspect are part of the relation which is given in experience? If Dr. Stoney could only see his way to this concession and could be led to adopt scientific monism, which is based on relativity, he would still secure all

that is valuable in his hypothesis, and at the same time get rid of the difficulties which as it stands encumber it. But it would no longer be a doctrine of *auta*.

For scientific monism is not a doctrine of *auta* but a doctrine of phenomena—phenomena regarded not only in their physical but also in their psychological aspect. Unifying these two diverse aspects, it contends that the conscious organism is one and indivisible; that it is a product of evolution; that in its physical or material aspect this evolution has given rise to the body and brain; that in its psychical or immaterial aspect it has given rise to the mind and human consciousness; that these two aspects, though distinguishable in analytic thought, are inseparable in phenomenal existence; that just as the complex modes of energy of the human brain have been evolved from the simpler modes of energy that are found throughout organic and inorganic nature, so too the complex modes of consciousness of the human mind have been evolved from the simpler modes of infra-consciousness* that are associated with merely organic and inorganic modes of energy. The last clause is admittedly hypothetical. But it is submitted that the hypothesis is one that is founded on strictly scientific and in no sense metaphysical or autic analysis.

C. Lloyd Morgan.

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* See *Mental Evolution* in *The Monist*, Vol. II, No. 2 (Jan. 1892), p. 161.

EVOLUTIONARY LOVE.

AT FIRST BLUSH. COUNTER-GOSPELS.

PHILOSOPHY, when just escaping from its golden pupa-skin, mythology, proclaimed the great evolutionary agency of the universe to be Love. Or, since this pirate-lingo, English, is poor in such-like words, let us say Eros, the exuberance-love. Afterwards, Empedocles set up passionate-love and hate as the two coördinate powers of the universe. In some passages, kindness is the word. But certainly, in any sense in which it has an opposite, to be senior partner of that opposite, is the highest position that love can attain. Nevertheless, the ontological gospeller, in whose days those views were familiar topics, made the One Supreme Being, by whom all things have been made out of nothing, to be cherishing-love. What, then, can he say to hate? Never mind, at this time, what the scribe of the apocalypse, if he were John, stung at length by persecution into a rage unable to distinguish suggestions of evil from visions of heaven, and so become the Slanderer of God to men, may have dreamed. The question is rather what the sane John thought, or ought to have thought, in order to carry out his idea consistently. His statement that God is love seems aimed at that saying of Ecclesiastes that we cannot tell whether God bears us love or hatred. "Nay," says John, "we can tell, and very simply! We know and have trusted the love which God hath in us. God is love." There is no logic in this, unless it means that God loves all men. In the preceding paragraph, he had said, "God is light and in him is no darkness at all." We are to understand, then, that as darkness is merely the defect of light, so hatred and evil are mere imperfect stages of

ἀγάπη and *ἀγαθόν*, love and loveliness. This concords with that utterance reported in John's Gospel: "God sent not the Son into the world to judge the world; but that the world should through him be saved. He that believeth on him is not judged: he that believeth not hath been judged already . . . And this is the judgment, that the light is come into the world, and that men loved darkness rather than the light." That is to say, God visits no punishment on them; they punish themselves, by their natural affinity for the defective. Thus, the love that God is, is not a love of which hatred is the contrary; otherwise Satan would be a coördinate power; but it is a love which embraces hatred as an imperfect stage of it, an Anteros—yea, even needs hatred and hatefulness as its object. For self-love is no love; so if God's self is love, that which he loves must be defect of love; just as a luminary can light up only that which otherwise would be dark. Henry James, the Swedenborgian, says: "It is no doubt very tolerable finite or creaturely love to love one's own in another, to love another for his conformity to one's self: but nothing can be in more flagrant contrast with the creative Love, all whose tenderness *ex vi termini* must be reserved only for what intrinsically is most bitterly hostile and negative to itself." This is from "Substance and Shadow: an Essay on the Physics of Creation." It is a pity he had not filled his pages with things like this, as he was able easily to do, instead of scolding at his reader and at people generally, until the physics of creation was wellnigh forgot. I must deduct, however, from what I just wrote: obviously no genius could make his every sentence as sublime as one which discloses for the problem of evil its everlasting solution.

The movement of love is circular, at one and the same impulse projecting creations into independency and drawing them into harmony. This seems complicated when stated so; but it is fully summed up in the simple formula we call the Golden Rule. This does not, of course, say, Do everything possible to gratify the egoistic impulses of others, but it says, Sacrifice your own perfection to the perfectionment of your neighbor. Nor must it for a moment be confounded with the Benthamite, or Helvetian, or Beccarian motto, Act for the greatest good of the greatest number. Love is not di-

rected to abstractions but to persons; not to persons we do not know, nor to numbers of people, but to our own dear ones, our family and neighbors. "Our neighbor," we remember, is one whom we live near, not locally perhaps, but in life and feeling.

Everybody can see that the statement of St. John is the formula of an evolutionary philosophy, which teaches that growth comes only from love, from—I will not say self-*sacrifice*, but from the ardent impulse to fulfil another's highest impulse. Suppose, for example, that I have an idea that interests me. It is my creation. It is my creature; for as shown in last July's *Monist*, it is a little person. I love it; and I will sink myself in perfecting it. It is not by dealing out cold justice to the circle of my ideas that I can make them grow, but by cherishing and tending them as I would the flowers in my garden. The philosophy we draw from John's gospel is that this is the way mind develops; and as for the cosmos, only so far as it yet is mind, and so has life, is it capable of further evolution. Love, recognising germs of loveliness in the hateful, gradually warms it into life, and makes it lovely. That is the sort of evolution which every careful student of my essay "The Law of Mind," must see that *synechism* calls for.

The nineteenth century is now fast sinking into the grave, and we all begin to review its doings and to think what character it is destined to bear as compared with other centuries in the minds of future historians. It will be called, I guess, the Economical Century; for political economy has more direct relations with all the branches of its activity than has any other science. Well, political economy has its formula of redemption, too. It is this: Intelligence in the service of greed ensures the justest prices, the fairest contracts, the most enlightened conduct of all the dealings between men, and leads to the *summum bonum*, food in plenty and perfect comfort. Food for whom? Why, for the greedy master of intelligence. I do not mean to say that this is one of the legitimate conclusions of political economy, the scientific character of which I fully acknowledge. But the study of doctrines, themselves true, will often temporarily encourage generalisations extremely false, as the study of physics has encouraged necessitarianism. What I say, then, is that

the great attention paid to economical questions during our century has induced an exaggeration of the beneficial effects of greed and of the unfortunate results of sentiment, until there has resulted a philosophy which comes unwittingly to this, that greed is the great agent in the elevation of the human race and in the evolution of the universe.

I open a handbook of political economy,—the most typical and middling one I have at hand,—and there find some remarks of which I will here make a brief analysis. I omit qualifications, sops thrown to Cerberus, phrases to placate Christian prejudice, trappings which serve to hide from author and reader alike the ugly nakedness of the greed-god. But I have surveyed my position. The author enumerates "three motives to human action:

The love of self;

The love of a limited class having common interests and feelings with one's self;

The love of mankind at large."

Remark, at the outset, what obsequious title is bestowed on greed,—"the love of self." Love! The second motive *is* love. In place of "a limited class" put "certain persons," and you have a fair description. Taking "class" in the old-fashioned sense, a weak kind of love is described. In the sequel, there seems to be some haziness as to the delimitation of this motive. By the love of mankind at large, the author does not mean that deep, subconscious passion that is properly so called; but merely public-spirit, perhaps little more than a fidget about pushing ideas. The author proceeds to a comparative estimate of the worth of these motives. Greed, says he, but using, of course, another word, "is not so great an evil as is commonly supposed . . . Every man can promote his own interests a great deal more effectively than he can promote any one else's, or than any one else can promote his." Besides, as he remarks on another page, the more miserly a man is, the more good he does. The second motive "is the most dangerous one to which society is exposed." Love is all very pretty: "no higher or purer source of human happiness exists." (Ahem!) But it is a "source of enduring

injury," and, in short, should be overruled by something wiser. What is this wiser motive? We shall see.

As for public spirit, it is rendered nugatory by the "difficulties in the way of its effective operation." For example, it might suggest putting checks upon the fecundity of the poor and the vicious; and "no measure of repression would be too severe," in the case of criminals. The hint is broad. But unfortunately, you cannot induce legislatures to take such measures, owing to the pestiferous "tender sentiments of man towards man." It thus appears, that public-spirit, or Benthamism, is not strong enough to be the effective tutor of love, (I am skipping to another page,) which must therefore be handed over to "the motives which animate men in the pursuit of wealth," in which alone we can confide, and which "are in the highest degree beneficent."* Yes, in the "highest degree" without exception are they beneficent to the being upon whom all their blessings are poured out, namely, the Self, whose "sole object," says the writer in accumulating wealth is his individual "sustenance and enjoyment." Plainly, the author holds the notion that some other motive might be in a higher degree beneficent even for the man's self to be a paradox wanting in good sense. He seeks to gloze and modify his doctrine; but he lets the perspicacious reader see what his animating principle is; and when, holding the opinions I have repeated, he at the same time acknowledges that society could not exist upon a basis of intelligent greed alone, he simply pigeon-holes himself as one of the eclectics of inharmonious opinions. He wants his mammon flavored with a *soupçon* of god.

The economists accuse those to whom the enunciation of their atrocious villainies communicates a thrill of horror of being *sentimentalists*. It may be so: I willingly confess to having some tincture of sentimentalism in me, God be thanked! Ever since the French Revolution brought this leaning of thought into ill-repute,—and not altogether undeservedly, I must admit, true, beautiful, and good as

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* How can a writer have any respect for science, as such, who is capable of confounding with the scientific propositions of political economy, which have nothing to say concerning what is "beneficent," such brummagem generalisations as this?

that great movement was,—it has been the tradition to picture sentimentalists as persons incapable of logical thought and unwilling to look facts in the eyes. This tradition may be classed with the French tradition that an Englishman says *godam* at every second sentence, the English tradition that an American talks about "Britishers," and the American tradition that a Frenchman carries forms of etiquette to an inconvenient extreme, in short with all those traditions which survive simply because the men who use their eyes and ears are few and far between. Doubtless some excuse there was for all those opinions in days gone by; and sentimentalism, when it was the fashionable amusement to spend one's evenings in a flood of tears over a woeful performance on a candle-litten stage, sometimes made itself a little ridiculous. But what after all is sentimentalism? It is an *ism*, a doctrine, namely, the doctrine that great respect should be paid to the natural judgments of the sensible heart. This is what sentimentalism precisely is; and I entreat the reader to consider whether to contemn it is not of all blasphemies the most degrading. Yet the nineteenth century has steadily contemned it, because it brought about the Reign of Terror. That it did so is true. Still, the whole question is one of *how much*. The reign of terror was very bad; but now the Gradgrind banner has been this century long flaunting in the face of heaven, with an insolence to provoke the very skies to scowl and rumble. Soon a flash and quick peal will shake economists quite out of their complacency, too late. The twentieth century, in its latter half, shall surely see the deluge-tempest burst upon the social order,—to clear upon a world as deep in ruin as that greed-philosophy has long plunged it into guilt. No post-thermidorian high jinks then!

So a miser is a beneficent power in a community, is he? With the same reason precisely, only in a much higher degree, you might pronounce the Wall Street sharp to be a good angel, who takes money from heedless persons not likely to guard it properly, who wrecks feeble enterprises better stopped, and who administers wholesome lessons to unwary scientific men, by passing worthless checks upon them,—as you did, the other day, to me, my millionaire Master in glomery, when you thought you saw your way to using

my process without paying for it, and of so bequeathing to your children something to boast of their father about,—and who by a thousand wiles puts money at the service of intelligent greed, in his own person. Bernard Mandeville, in his "Fable of the Bees," maintains that private vices of all descriptions are public benefits, and proves it, too, quite as cogently as the economist proves his point concerning the miser. He even argues, with no slight force, that but for vice civilisation would never have existed. In the same spirit, it has been strongly maintained and is to-day widely believed that all acts of charity and benevolence, private and public, go seriously to degrade the human race.

The "Origin of Species" of Darwin merely extends politico-economical views of progress to the entire realm of animal and vegetable life. The vast majority of our contemporary naturalists hold the opinion that the true cause of those exquisite and marvellous adaptations of nature for which, when I was a boy, men used to extol the divine wisdom is that creatures are so crowded together that those of them that happen to have the slightest advantage force those less pushing into situations unfavorable to multiplication or even kill them before they reach the age of reproduction. Among animals, the mere mechanical individualism is vastly reënforced as a power making for good by the animal's ruthless greed. As Darwin puts it on his title-page, it is the struggle for existence; and he should have added for his motto: Every individual for himself, and the Devil take the hindmost! Jesus, in his sermon on the Mount, expressed a different opinion.

Here, then, is the issue. The gospel of Christ says that progress comes from every individual merging his individuality in sympathy with his neighbors. On the other side, the conviction of the nineteenth century is that progress takes place by virtue of every individual's striving for himself with all his might and trampling his neighbor under foot whenever he gets a chance to do so. This may accurately be called the Gospel of Greed.

Much is to be said on both sides. I have not concealed, I could not conceal, my own passionate predilection. Such a confession will probably shock my scientific brethren. Yet the strong feeling

is in itself, I think, an argument of some weight in favor of the agapastic theory of evolution,—so far as it may be presumed to bespeak the normal judgment of the Sensible Heart. Certainly, if it were possible to believe in agapasm without believing it warmly, that fact would be an argument against the truth of the doctrine. At any rate, since the warmth of feeling exists, it should on every account be candidly confessed ; especially since it creates a liability to one-sidedness on my part against which it behooves my readers and me to be severally on our guard.

SECOND THOUGHTS. IRENICA.

Let us try to define the logical affinities of the different theories of evolution. Natural selection, as conceived by Darwin, is a mode of evolution in which the only positive agent of change in the whole passage from moner to man is fortuitous variation. To secure advance in a definite direction chance has to be seconded by some action that shall hinder the propagation of some varieties or stimulate that of others. In natural selection, strictly so called, it is the crowding out of the weak. In sexual selection, it is the attraction of beauty, mainly.

The "Origin of Species" was published toward the end of the year 1859. The preceding years since 1846 had been one of the most productive seasons,—or if extended so as to cover the great book we are considering, *the* most productive period of equal length in the entire history of science from its beginnings until now. The idea that chance begets order, which is one of the corner-stones of modern physics (although Dr. Carus considers it "the weakest point in Mr. Peirce's system,") was at that time put into its clearest light. Quetelet had opened the discussion by his "Letters on the Application of Probabilities to the Moral and Political Sciences," a work which deeply impressed the best minds of that day, and to which Sir John Herschel had drawn general attention in Great Britain. In 1857, the first volume of Buckle's "History of Civilisation" had created a tremendous sensation, owing to the use he made of this same idea. Meantime, the "statistical method" had, under that very name, been applied with brilliant success to molecular physics. Dr.

John Herapath, an English chemist, had in 1847 outlined the kinetical theory of gases in his "Mathematical Physics"; and the interest the theory excited had been refreshed in 1856 by notable memoirs by Clausius and Krönig. In the very summer preceding Darwin's publication, Maxwell had read before the British Association the first and most important of his researches on this subject. The consequence was that the idea that fortuitous events may result in a physical law, and further that this is the way in which those laws which appear to conflict with the principle of the conservation of energy are to be explained, had taken a strong hold upon the minds of all who were abreast of the leaders of thought. By such minds, it was inevitable that the "Origin of Species," whose teaching was simply the application of the same principle to the explanation of another "non-conservative" action, that of organic development, should be hailed and welcomed. The sublime discovery of the conservation of energy by Helmholtz in 1847, and that of the mechanical theory of heat by Clausius and by Rankine, independently, in 1850, had decidedly overawed all those who might have been inclined to sneer at physical science. Thereafter a belated poet still harping upon "science peddling with the names of things" would fail of his effect. Mechanism was now known to be all, or very nearly so. All this time, utilitarianism,—that improved substitute for the Gospel,—was in its fullest feather; and was a natural ally of an individualistic theory. Dean Mansell's injudicious advocacy had led to mutiny among the bondsmen of Sir William Hamilton, and the nominalism of Mill had profited accordingly; and although the real science that Darwin was leading men to was sure some day to give a death-blow to the sham-science of Mill, yet there were several elements of the Darwinian theory which were sure to charm the followers of Mill. Another thing: anæsthetics had been in use for thirteen years. Already, people's acquaintance with suffering had dropped off very much; and as a consequence, that unlovely hardness by which our times are so contrasted with those that immediately preceded them, had already set in, and inclined people to relish a ruthless theory. The reader would quite mistake the drift of what I am saying if he were to understand me as wishing to suggest that any of those things

(except perhaps Malthus) influenced Darwin himself. What I mean is that his hypothesis, while without dispute one of the most ingenious and pretty ever devised, and while argued with a wealth of knowledge, a strength of logic, a charm of rhetoric, and above all with a certain magnetic genuineness that was almost irresistible, did not appear, at first, at all near to being proved; and to a sober mind its case looks less hopeful now than it did twenty years ago; but the extraordinarily favorable reception it met with was plainly owing, in large measure, to its ideas being those toward which the age was favorably disposed, especially, because of the encouragement it gave to the greed-philosophy.

Diametrically opposed to evolution by chance, are those theories which attribute all progress to an inward necessary principle, or other form of necessity. Many naturalists have thought that if an egg is destined to go through a certain series of embryological transformations, from which it is perfectly certain not to deviate, and if in geological time almost exactly the same forms appear successively, one replacing another in the same order, the strong presumption is that this latter succession was as predeterminate and certain to take place as the former. So, Nägeli, for instance, conceives that it somehow follows from the first law of motion and the peculiar, but unknown, molecular constitution of protoplasm, that forms must complicate themselves more and more. Kölliker makes one form generate another after a certain maturation has been accomplished. Weismann, too, though he calls himself a Darwinian, holds that nothing is due to chance, but that all forms are simple mechanical resultants of the heredity from two parents.* It is very noticeable that all these different sectaries seek to import into their science a mechanical necessity to which the facts that come under their observation do not point. Those geologists who think that the variation of species is due to cataclasmic alterations of climate or of the chemical constitution of the air and water are also making mechanical necessity chief factor of evolution.

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* I am happy to find that Dr. Carus, too, ranks Weismann among the opponents of Darwin, notwithstanding his flying that flag.

Evolution by sporting and evolution by mechanical necessity are conceptions warring against one another. A third method, which supersedes their strife, lies enwrapped in the theory of Lamarck. According to his view, all that distinguishes the highest organic forms from the most rudimentary has been brought about by little hypertrophies or atrophies which have affected individuals early in their lives, and have been transmitted to their offspring. Such a transmission of acquired characters is of the general nature of habit-taking, and this is the representative and derivative within the physiological domain of the law of mind. Its action is essentially dissimilar to that of a physical force; and that is the secret of the repugnance of such necessitarians as Weismann to admitting its existence. The Lamarckians further suppose that although some of the modifications of form so transmitted were originally due to mechanical causes, yet the chief factors of their first production were the straining of endeavor and the overgrowth superinduced by exercise, together with the opposite actions. Now, endeavor, since it is directed toward an end, is essentially psychical, even though it be sometimes unconscious; and the growth due to exercise, as I argued in my last paper, follows a law of a character quite contrary to that of mechanics.

Lamarckian evolution is thus evolution by the force of habit.—That sentence slipped off my pen while one of those neighbors whose function in the social cosmos seems to be that of an Interrupter, was asking me a question. Of course, it is nonsense. Habit is mere inertia, a resting on one's oars, not a propulsion. Now it is energetic projaculation (lucky there is such a word, or this untried hand might have been put to inventing one) by which in the typical instances of Lamarckian evolution the new elements of form are first created. Habit, however, forces them to take practical shapes, compatible with the structures they affect, and in the form of heredity and otherwise, gradually replaces the spontaneous energy that sustains them. Thus, habit plays a double part; it serves to establish the new features, and also to bring them into harmony with the general morphology and function of the animals and plants to which they belong. But if the reader will now kindly give himself the trouble of turning back a page or two, he will see that this account of Lamarckian evo-

lution coincides with the general description of the action of love, to which, I suppose, he yielded his assent.

Remembering that all matter is really mind, remembering, too, the continuity of mind, let us ask what aspect Lamarckian evolution takes on within the domain of consciousness. Direct endeavor can achieve almost nothing. It is as easy by taking thought to add a cubit to one's stature, as it is to produce an idea acceptable to any of the Muses by merely straining for it, before it is ready to come. We haunt in vain the sacred well and throne of Mnemosyne; the deeper workings of the spirit take place in their own slow way, without our connivance. Let but their bugle sound, and we may then make our effort, sure of an oblation for the altar of whatsoever divinity its savor gratifies. Besides this inward process, there is the operation of the environment, which goes to break up habits destined to be broken up and so to render the mind lively. Everybody knows that the long continuance of a routine of habit makes us lethargic, while a succession of surprises wonderfully brightens the ideas. Where there is a motion, where history is a-making, there is the focus of mental activity, and it has been said that the arts and sciences reside within the temple of Janus, waking when that is open, but slumbering when it is closed. Few psychologists have perceived how fundamental a fact this is. A portion of mind abundantly commissured to other portions works almost mechanically. It sinks to the condition of a railway junction. But a portion of mind almost isolated, a spiritual peninsula, or *cul-de-sac*, is like a railway terminus. Now mental commissures are habits. Where they abound, originality is not needed and is not found; but where they are in defect, spontaneity is set free. Thus, the first step in the Lamarckian evolution of mind is the putting of sundry thoughts into situations in which they are free to play. As to growth by exercise, I have already shown, in discussing "Man's Glassy Essence," in last October's *Monist*, what its *modus operandi* must be conceived to be, at least, until a second equally definite hypothesis shall have been offered. Namely, it consists of the flying asunder of molecules, and the reparation of the parts by new matter. It is, thus, a sort of reproduction. It takes place only during exercise, because the activ-

ity of protoplasm consists in the molecular disturbance which is its necessary condition. Growth by exercise takes place also in the mind. Indeed, that is what it is to *learn*. But the most perfect illustration is the development of a philosophical idea by being put into practice. The conception which appeared, at first, as unitary, splits up into special cases; and into each of these new thought must enter to make a practicable idea. This new thought, however, follows pretty closely the model of the parent conception; and thus a homogeneous development takes place. The parallel between this and the course of molecular occurrences is apparent. Patient attention will be able to trace all these elements in the transaction called learning.

Three modes of evolution have thus been brought before us; evolution by fortuitous variation, evolution by mechanical necessity, and evolution by creative love. We may term them *tychastic* evolution, or *tychasm*, *anancastic* evolution, or *anancasm*, and *agapastic* evolution, or *agapasm*. The doctrines which represent these as severally of principal importance, we may term *tychasticism*, *anancasticism*, and *agapasticism*. On the other hand the mere propositions that absolute chance, mechanical necessity, and the law of love, are severally operative in the cosmos, may receive the names of *tychism*, *anancism*, and *agapism*.

All three modes of evolution are composed of the same general elements. Agapasm exhibits them the most clearly. The good result is here brought to pass, first, by the bestowal of spontaneous energy by the parent upon the offspring, and, second, by the disposition of the latter to catch the general idea of those about it and thus to subserve the general purpose. In order to express the relation that tychasm and anancasm bear to agapasm, let me borrow a word from geometry. An ellipse crossed by a straight line is a sort of cubic curve; for a cubic is a curve which is cut thrice by a straight line; now a straight line might cut the ellipse twice and its associated straight line a third time. Still the ellipse with the straight line across it would not have the characteristics of a cubic. It would have, for instance, no contrary flexure, which no true cubic wants; and it would have two nodes, which no true cubic has. The geom-

eters say that it is a *degenerate* cubic. Just so, tychasm and anancasm are degenerate forms of agapasm.

Men who seek to reconcile the Darwinian idea with Christianity will remark that tychastic evolution, like the agapastic, depends upon a reproductive creation, the forms preserved being those that use the spontaneity conferred upon them in such wise as to be drawn into harmony with their original, quite after the Christian scheme. Very good! This only shows that just as love cannot have a contrary, but must embrace what is most opposed to it, as a degenerate case of it, so tychasm is a kind of agapasm. Only, in the tychastic evolution progress is solely owing to the distribution of the napkin-hidden talent of the rejected servant among those not rejected, just as ruined gamesters leave their money on the table to make those not yet ruined so much the richer. It makes the felicity of the lambs just the damnation of the goats, transposed to the other side of the equation. In genuine agapasm, on the other hand, advance takes place by virtue of a positive sympathy among the created springing from continuity of mind. This is the idea which tychasticism knows not how to manage.

The anancasticist might here interpose, claiming that the mode of evolution for which he contends agrees with agapasm at the point at which tychasm departs from it. For it makes development go through certain phases, having its inevitable ebbs and flows, yet tending on the whole to a foreordained perfection. Bare existence by this its destiny betrays an intrinsic affinity for the good. Herein, it must be admitted, anancasm shows itself to be in a broad acception a species of agapasm. Some forms of it might easily be mistaken for the genuine agapasm. The Hegelian philosophy is such an anancasticism. With its revelatory religion, with its synechism (however imperfectly set forth), with its "reflection," the whole idea of the theory is superb, almost sublime. Yet, after all, living freedom is practically omitted from its method. The whole movement is that of a vast engine, impelled by a *vis a tergo*, with a blind and mysterious fate of arriving at a lofty goal. I mean that such an engine it *would* be, if it really worked; but in point of fact, it is a Keely motor. Grant that it really acts as it professes to act, and

there is nothing to do but accept the philosophy. But never was there seen such an example of a long chain of reasoning,—shall I say with a flaw in every link?—no, with every link a handful of sand, squeezed into shape in a dream. Or say, it is a pasteboard model of a philosophy that in reality does not exist. If we use the one precious thing it contains, the idea of it, introducing the tychism which the arbitrariness of its every step suggests, and make that the support of a vital freedom which is the breath of the spirit of love, we may be able to produce that genuine agapasticism, at which Hegel was aiming.

A THIRD ASPECT. DISCRIMINATION.

In the very nature of things, the line of demarcation between the three modes of evolution is not perfectly sharp. That does not prevent its being quite real; perhaps it is rather a mark of its reality. There is in the nature of things no sharp line of demarcation between the three fundamental colors, red, green, and violet. But for all that they are really different. The main question is whether three radically different evolutionary elements have been operative; and the second question is what are the most striking characteristics of whatever elements have been operative.

I propose to devote a few pages to a very slight examination of these questions in their relation to the historical development of human thought. I first formulate for the reader's convenience the briefest possible definitions of the three conceivable modes of development of thought, distinguishing also two varieties of anancasm and three of agapasm. The tychastic development of thought, then, will consist in slight departures from habitual ideas in different directions indifferently, quite purposeless and quite unconstrained whether by outward circumstances or by force of logic, these new departures being followed by unforeseen results which tend to fix some of them as habits more than others. The anancastic development of thought will consist of new ideas adopted without foreseeing whither they tend, but having a character determined by causes either external to the mind, such as changed circumstances of life, or internal to the mind as logical developments of ideas already ac-

cepted, such as generalisations. The agapastic development of thought is the adoption of certain mental tendencies, not altogether heedlessly, as in tychasm, nor quite blindly by the mere force of circumstances or of logic, as in anancasm, but by an immediate attraction for the idea itself, whose nature is divined before the mind possesses it, by the power of sympathy, that is, by virtue of the continuity of mind; and this mental tendency may be of three varieties, as follows. First, it may affect a whole people or community in its collective personality, and be thence communicated to such individuals as are in powerfully sympathetic connection with the collective people, although they may be intellectually incapable of attaining the idea by their private understandings or even perhaps of consciously apprehending it. Second, it may affect a private person directly, yet so that he is only enabled to apprehend the idea, or to appreciate its attractiveness, by virtue of his sympathy with his neighbors, under the influence of a striking experience or development of thought. The conversion of St. Paul may be taken as an example of what is meant. Third, it may affect an individual, independently of his human affections, by virtue of an attraction it exercises upon his mind, even before he has comprehended it. This is the phenomenon which has been well called the *divination* of genius; for it is due to the continuity between the man's mind and the Most High.

Let us next consider by means of what tests we can discriminate between these different categories of evolution. No absolute criterion is possible in the nature of things, since in the nature of things there is no sharp line of demarcation between the different classes. Nevertheless, quantitative symptoms may be found by which a sagacious and sympathetic judge of human nature may be able to estimate the approximate proportions in which the different kinds of influence are commingled.

So far as the historical evolution of human thought has been tychastic, it should have proceeded by insensible or minute steps; for such is the nature of chances when so multiplied as to show phenomena of regularity. For example, assume that of the native-born white adult males of the United States in 1880, one fourth part

were below 5 feet 4 inches in stature and one fourth part above 5 feet 8 inches. Then by the principles of probability, among the whole population, we should expect

216	under	4	feet	6	inches.	216	above	6	feet	6	inches.
48	"	4	"	5	"	48	"	6	"	7	"
9	"	4	"	4	"	9	"	6	"	8	"
less than 2	"	4	"	3	"	less than 2	"	6	"	9	"

I set down these figures to show how insignificantly few are the cases in which anything very far out of the common run presents itself by chance. Though the stature of only every second man is included within the four inches between 5 feet 4 inches and 5 feet 8 inches, yet if this interval be extended by thrice four inches above and below, it will embrace all our 8 millions odd of native-born adult white males (of 1880), except only 9 taller and 9 shorter.

The test of minute variation, if *not* satisfied, absolutely negatives tychasm. If it *is* satisfied, we shall find that it negatives anancasm but not agapasm. We want a positive test, satisfied by tychasm, only. Now wherever we find men's thought taking by imperceptible degrees a turn contrary to the purposes which animate them, in spite of their highest impulses, there, we may safely conclude, there has been a tychastic action.

Students of the history of mind there be of an erudition to fill an imperfect scholar like me with envy edulcorated by joyous admiration, who maintain that ideas when just started are and can be little more than freaks, since they cannot yet have been critically examined, and further that everywhere and at all times progress has been so gradual that it is difficult to make out distinctly what original step any given man has taken. It would follow that tychasm has been the sole method of intellectual development. I have to confess I cannot read history so; I cannot help thinking that while tychasm has sometimes been operative, at others great steps covering nearly the same ground and made by different men independently, have been mistaken for a succession of small steps, and further that students have been reluctant to admit a real entitative "spirit" of an age or of a people, under the mistaken and unscrutinised impression that they should thus be opening the door to wild and unnatural

hypotheses. I find, on the contrary, that, however it may be with the education of individual minds, the historical development of thought has seldom been of a tychastic nature, and exclusively in backward and barbarising movements. I desire to speak with the extreme modesty which befits a student of logic who is required to survey so very wide a field of human thought that he can cover it only by a reconnaisance, to which only the greatest skill and most adroit methods can impart any value at all; but, after all, I can only express my own opinions and not those of anybody else; and in my humble judgment, the largest example of tychasm is afforded by the history of Christianity, from about its establishment by Constantine, to, say, the time the of Irish monasteries, an era or eon of about 500 years. Undoubtedly the external circumstance which more than all others at first inclined men to accept Christianity in its loveliness and tenderness, was the fearful extent to which society was broken up into units by the unmitigated greed and hard-heartedness into which the Romans had seduced the world. And yet it was that very same fact, more than any other external circumstance, that fostered that bitterness against the wicked world of which the primitive Gospel of Mark contains not a single trace. At least, I do not detect it in the remark about the blasphemy against the Holy Ghost, where nothing is said about vengeance, nor even in that speech where the closing lines of Isaiah are quoted, about the worm and the fire that feed upon the "carcasses of the men that have transgressed against me." But little by little the bitterness increases until in the last book of the New Testament, its poor distracted author represents that all the time Christ was talking about having come to save the world, the secret design was to catch the entire human race, with the exception of a paltry 144000, and souse them all in brimstone lake, and as the smoke of their torment went up for ever and ever, to turn and remark, "There is no curse any more." Would it be an insensible smirk or a fiendish grin that should accompany such an utterance? I wish I could believe St. John did not write it; but it is his gospel which tells about the "resurrection unto condemnation,"—that is of men's being resuscitated just for the sake of torturing them;—and, at any rate, the Revelation is a

very ancient composition. One can understand that the early Christians were like men trying with all their might to climb a steep declivity of smooth wet clay; the deepest and truest element of their life, animating both heart and head, was universal love; but they were continually, and against their wills, slipping into a party spirit, every slip serving as a precedent, in a fashion but too familiar to every man. This party feeling insensibly grew until by about A. D. 330 the lustre of the pristine integrity that in St. Mark reflects the white spirit of light was so far tarnished that Eusebius, (the Jared Sparks of that day,) in the preface to his History, could announce his intention of exaggerating everything that tended to the glory of the church and of suppressing whatever might disgrace it. His Latin contemporary Lactantius is worse, still; and so the darkling went on increasing until before the end of the century the great library of Alexandria was destroyed by Theophilus,* until Gregory the Great, two centuries later, burnt the great library of Rome, proclaiming that "Ignorance is the mother of devotion," (which is true, just as oppression and injustice is the mother of spirituality,) until a sober description of the state of the church would be a thing our not too nice newspapers would treat as "unfit for publication." All this movement is shown by the application of the test given above to have been tychastic. Another very much like it on a small scale, only a hundred times swifter, for the study of which there are documents by the library-full, is to be found in the history of the French Revolution.

Anancastic evolution advances by successive strides with pauses between. The reason is that in this process a habit of thought having been overthrown is supplanted by the next strongest. Now this next strongest is sure to be widely disparate from the first, and as often as not is its direct contrary. It reminds one of our old rule of making the second candidate vice-president. This character, therefore, clearly distinguishes anancasm from tychasm. The character which distinguishes it from agapasm is its purposelessness. But external and internal anancasm have to be examined separately.

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* See *Draper's History of Intellectual Development*, chap. x.

Development under the pressure of external circumstances, or cataclasmine evolution, is in most cases unmistakable enough. It has numberless degrees of intensity, from the brute force, the plain war, which has more than once turned the current of the world's thought, down to the hard fact of evidence, or what has been taken for it, which has been known to convince men by hordes. The only hesitation that can subsist in the presence of such a history is a quantitative one. Never are external influences the only ones which affect the mind, and therefore it must be a matter of judgment for which it would scarcely be worth while to attempt to set rules, whether a given movement is to be regarded as principally governed from without or not. In the rise of medieval thought, I mean scholasticism and the synchronistic art developments, undoubtedly the crusades and the discovery of the writings of Aristotle were powerful influences. The development of scholasticism from Roscellin to Albertus Magnus closely follows the successive steps in the knowledge of Aristotle. Prantl thinks that that is the whole story, and few men have thumbed more books than Carl Prantl. He has done good solid work, notwithstanding his slap-dash judgments. But we shall never make so much as a good beginning of comprehending scholasticism until the whole has been systematically explored and digested by a company of students regularly organised and held under rule for that purpose. But as for the period we are now specially considering, that which synchronised the Romanesque architecture, the literature is easily mastered. It does not quite justify Prantl's dicta as to the slavish dependence of these authors upon their authorities. Moreover, they kept a definite purpose steadily before their minds, throughout all their studies. I am, therefore, unable to offer this period of scholasticism as an example of pure external anancasm, which seems to be the fluorine of the intellectual elements. Perhaps the recent Japanese reception of western ideas is the purest instance of it in history. Yet in combination with other elements, nothing is commoner. If the development of ideas under the influence of the study of external facts be considered as external anancasm,—it is on the border between the external and the internal forms,—it is, of course, the principal thing in modern learning. But Whewell, whose masterly

comprehension of the history of science critics have been too ignorant properly to appreciate, clearly shows that it is far from being the overwhelmingly preponderant influence, even there.

Internal anancasm, or logical groping, which advances upon a predestined line without being able to foresee whither it is to be carried nor to steer its course, this is the rule of development of philosophy. Hegel first made the world understand this; and he seeks to make logic not merely the subjective guide and monitor of thought, which was all it had been ambitioning before, but to be the very mainspring of thinking, and not merely of individual thinking but of discussion, of the history of the development of thought, of all history, of all development. This involves a positive, clearly demonstrable error. Let the logic in question be of whatever kind it may, a logic of necessary inference or a logic of probable inference, (the theory might perhaps be shaped to fit either,) in any case it supposes that logic is sufficient of itself to determine what conclusion follows from given premises; for unless it will do so much, it will not suffice to explain why an individual train of reasoning should take just the course it does take, to say nothing of other kinds of development. It thus supposes that from given premises, only one conclusion can logically be drawn, and that there is no scope at all for free choice. That from given premises only one conclusion can logically be drawn, is one of the false notions which have come from logicians' confining their attention to that Nantucket of thought, the logic of non-relative terms. In the logic of relatives, it does not hold good.

One remark occurs to me. If the evolution of history is in considerable part of the nature of internal anancasm, it resembles the development of individual men; and just as 33 years is a rough but natural unit of time for individuals, being the average age at which man has issue, so there should be an approximate period at the end of which one great historical movement ought to be likely to be supplanted by another. Let us see if we can make out anything of the kind. Take the governmental development of Rome as being sufficiently long and set down the principal dates.

B. C. 753, Foundation of Rome.
B. C. 510, Expulsion of the Tarquins.
B. C. 27, Octavius assumes title Augustus.
A. D. 476, End of Western Empire.
A. D. 962, Holy Roman Empire.
A. D. 1453, Fall of Constantinople.

The last event was one of the most significant in history, especially for Italy. The intervals are 243, 483, 502, 486, 491 years. All are rather curiously near equal, except the first which is half the others. Successive reigns of kings would not commonly be so near equal. Let us set down a few dates in the history of thought.

B. C. 585, Eclipse of Thales. Beginning of Greek philosophy.
A. D. 30, The crucifixion.
A. D. 529, Closing of Athenian schools. End of Greek philosophy.
A. D. 1125, (Approximate) Rise of the Universities of Bologna and Paris.
A. D. 1543, Publication of the "De Revolutionibus" of Copernicus. Beginning of Modern Science.

The intervals are 615, 499, 596, 418, years. In the history of metaphysics, we may take the following:

B. C. 322, Death of Aristotle.
A. D. 1274, Death of Aquinas.
A. D. 1804, Death of Kant.

The intervals are 1595 and 530 years. The former is about thrice the latter.

From these figures, no conclusion can fairly be drawn. At the same time, they suggest that perhaps there may be a rough natural era of about 500 years. Should there be any independent evidence of this, the intervals noticed may gain some significance.

The agapastic development of thought should, if it exists, be distinguished by its purposive character, this purpose being the development of an idea. We should have a direct agapic or sympathetic comprehension and recognition of it, by virtue of the continuity of thought. I here take it for granted that such continuity of thought has been sufficiently proved by the arguments used in my paper on the "Law of Mind" in *The Monist* of last July. Even if those arguments are not quite convincing in themselves, yet if they

are reënforced by an apparent agapasm in the history of thought, the two propositions will lend one another mutual aid. The reader will, I trust, be too well grounded in logic to mistake such mutual support for a vicious circle in reasoning. If it could be shown directly that there is such an entity as the "spirit of an age" or of a people, and that mere individual intelligence will not account for all the phenomena, this would be proof enough at once of agapasticism and of synechism. I must acknowledge that I am unable to produce a cogent demonstration of this; but I am, I believe, able to adduce such arguments as will serve to confirm those which have been drawn from other facts. I believe that all the greatest achievements of mind have been beyond the powers of unaided individuals; and I find, apart from the support this opinion receives from synechistic considerations, and from the purposive character of many great movements, direct reason for so thinking in the sublimity of the ideas and in their occurring simultaneously and independently to a number of individuals of no extraordinary general powers. The pointed Gothic architecture in several of its developments appears to me to be of such a character. All attempts to imitate it by modern architects of the greatest learning and genius appear flat and tame, and are felt by their authors to be so. Yet at the time the style was living, there was quite an abundance of men capable of producing works of this kind of gigantic sublimity and power. In more than one case, extant documents show that the cathedral chapters, in the selection of architects, treated high artistic genius as a secondary consideration, as if there were no lack of persons able to supply that; and the results justify their confidence. Were individuals in general, then, in those ages possessed of such lofty natures and high intellect? Such an opinion would break down under the first examination.

How many times have men now in middle life seen great discoveries made independently and almost simultaneously! The first instance I remember was the prediction of a planet exterior to Uranus by Leverrier and Adams. One hardly knows to whom the principle of the conservation of energy ought to be attributed, although it may reasonably be considered as the greatest discovery

science has ever made. The mechanical theory of heat was set forth by Rankine and by Clausius during the same month of February, 1850; and there are eminent men who attribute this great step to Thomson.* The kinetical theory of gases, after being started by John Bernoulli and long buried in oblivion, was reinvented and applied to the explanation not merely of the laws of Boyle, Charles, and Avogadro, but also of diffusion and viscosity, by at least three modern physicists separately. It is well known that the doctrine of natural selection was presented by Wallace and by Darwin at the same meeting of the British Association; and Darwin in his "Historical Sketch" prefixed to the later editions of his book shows that both were anticipated by obscure forerunners. The method of spectrum analysis was claimed for Swan as well as for Kirchhoff, and there were others who perhaps had still better claims. The authorship of the Periodical Law of the Chemical Elements is disputed between a Russian, a German, and an Englishman; although there is no room for doubt that the principal merit belongs to the first. These are nearly all the greatest discoveries of our times. It is the same with the inventions. It may not be surprising that the telegraph should have been independently made by several inventors, because it was an easy corollary from scientific facts well made out before. But it was not so with the telephone and other inventions. Ether, the first anæsthetic, was introduced independently by three different New England physicians. Now ether had been a common article for a century. It had been in one of the pharmacopœias three centuries before. It is quite incredible that its anæsthetic property should not have been known; it was known. It had probably passed from mouth to ear as a secret from the days of Basil Valentine; but for long it had been a secret of the Punchinello kind. In New England, for many years, boys had used it for amusement. Why then had it not been put to its serious use? No reason can be given, except that the motive to do so was not strong enough. The motives to doing so could only have been desire for gain and philanthropy. About 1846, the

* Thomson, himself, in his article *Heat* in the *Encyclopedia Britannica*, never once mentions the name of Clausius.

date of the introduction, philanthropy was undoubtedly in an unusually active condition. That sensibility, or sentimentalism, which had been introduced in the previous century, had undergone a ripening process, in consequence of which, though now less intense than it had previously been, it was more likely to influence unreflecting people than it had ever been. All three of the ether-claimants had probably been influenced by the desire for gain; but nevertheless they were certainly not insensible to the agapic influences.

I doubt if any of the great discoveries ought, properly, to be considered as altogether individual achievements; and I think many will share this doubt. Yet, if not, what an argument for the continuity of mind, and for agapasticism is here! I do not wish to be very strenuous. If thinkers will only be persuaded to lay aside their prejudices and apply themselves to studying the evidences of this doctrine, I shall be fully content to await the final decision.

CHARLES S. PEIRCE.

RENAN.

A DISCOURSE GIVEN AT SOUTH PLACE CHAPEL, LONDON, OCTOBER, 9, 1892.

"Be calm and resigned," said Renan to his weeping wife. "We undergo the laws of that nature of which we are manifestations. We perish, we disappear, but heaven and earth remain, and the march of time goes on for ever."

It is hard to-day to respond to these last words of the dying philosopher. Heaven and earth remain, but they seem cold and grey when the great heart in which they were united has ceased to beat, and when our sweet English singer has gone silent. By the passing away of the two highest-mounted minds in Europe this society is especially bereaved. The earliest welcome given to the genius of young Tennyson came from the pen of William Johnston Fox, the first Minister of this Chapel; here has his spiritual pilgrimage been followed, and its songs here sung as hymns. But for their magnitude Tennyson and Renan might have been considered together. They were children of the same spiritual epoch; the son of the Catholic Church, and the English Rector's son, were fellow-pilgrims on the painful road of scepticism; they encountered the same phantoms, were attended by the same mighty shades, and found no altar but such as their own genius could raise and their glowing hearts kindle in the wilderness of doubt and denial. Alike they distrusted democracy, and dreamed of the ideal monarch,—as of Arthur, "flower of kings," whom ancient legends of Britain and Brittany said would some day return to lead up the Golden Year. Renan loved to tell the story of how Tennyson, roaming in Brittany, stopped at an inn

in Lannier, birthplace of Renan's mother. In the morning the poet demanded his account, but the hostess said, "There is nothing to pay, Monsieur. It is you who have sung of our King Arthur."

But the people have a greatness of their own. They enshrine Tennyson in Westminster Abbey, Renan in the Pantheon. The career of Renan is a triumph of republican France. Under the Empire he was deprived of his professorship, and of his office in the Imperial Library, for writing the "Life of Jesus." But the Republic made him President of the College of France, gave him every honor, in life as in death. The national homage to that ex-priest, that outspoken rationalist, who flattered not the masses nor fawned on power, is a high water-mark of civilisation. For it marks the rise of a steady tide of liberty, and not the mere leap of waves under some tempest of momentary emotion. The great fact is that this unique heretic, thinker, and scholar, has been able, without compromising his independence, without help of any sect or school, to live his life, think his thought, and round out his life-work with completeness, on the scene of a thousand martyrdoms.

In Renan's "Feuilles Détachées," which appeared last spring but is not yet translated, there are outbursts of gratitude to his time, which, he says, has been good to him, and pardoned many faults. He had just finished, he says, his "History of the People of Israel"—"the serious work of my life."

> "The bridge which it remained to me to build between Judaism and Christianism is built. . . . In the 'Life of Jesus' I tried to exhibit the majestic growth of the Galilean tree from the stock of its roots to the summit, where sing the birds of heaven. In the volume just finished I have sought to make known the subsoil in which shot the roots of Jesus. Thus my principal duty is accomplished. At the Academy the work on the Rabbins also nears conclusion, and the *Corpus Inscriptionum Semiticorum* is in excellent hands. So that now, having paid all my debts, I am free enough to amuse myself a little, and without scruples to indulge myself with the pleasure of gathering these leaves, often light enough."

So radiant was the author, at sixty-nine, having achieved the main schemes of a life which, at forty, was threatened with ruin by intolerance. Of course it was but a small part of what he would fain have accomplished. Last year (September 11) there was a fes-

tival in the Island of Bréhat, where Renan was the chief speaker. In the course of his address he said :

"Every year I used to come hither with my mother to visit my aunt Périne, who loved me much, for she thought me like my father. Here on your rocks, and in your paths, I formed plans and dreamed dreams, of which I have realised a third or a quarter. That is much ; I consider myself fortunate ; I hold myself among the privileged ones of life. I have been more sad than now, for I feared I might die young (misfortune notably not arrived) and never produce what was in my mind. Oh certainly, could I live a long time yet, I would know what to do. I have schemes of work for three or four lives. I would write a history of the French Revolution, showing it an attack of fever, grand, strange, horrible, and sublime ; the foundation, let us hope of something better. I would compose a history of Athens, almost day by day ; also a history of science and freethought, telling by what steps man has come to know something of how the world is made ; I would write a history of Brittany in six volumes. I would study Chinese, and review critically all the problems of Chinese history and literature. Of all that I would make nothing. There is a crowd of things I wish to know and shall never know. But why reproach nature for refusing me? Let us recognise what she has given us. I have traversed the world at an interesting moment in its development, and, after all, have seen enough. After my time humanity will do surprising things : I can rest content during eternity."

The happiness of this venerable author, conscious that his life is closing, his work ended,—a happiness not derived from any hope of future reward, or even existence,—is a salient testimony of our time. In one of these recent addresses Renan says : "Let us die calmly, in the communion of humanity, the religion of the future." The dying Voltaire was fed with a wafer, even while he ridiculed it. Renan partakes the communion of humanity, the religion of the future. It may appear cold comfort to the superstitious, for they comprehend not that to such a man the communion of humanity implies an eternal life.

In one sense Renan lived not quite threescore years and ten ; in another he lived ages on ages. By his mastery of Eastern and Oriental languages and literatures, by his studies of ancient and modern systems, he had familiarly dwelt among primitive tribes, with them set up their sacred dolmens, knelt at their altars, travelled with their migrations in India, Persia, Egypt, Syria, shared their pilgrimages from lower to higher beliefs, listened to their prophets, visited the

home of Mary and Joseph, walked with the disciples, conversed with Jesus, witnessed the crucifixion, journeyed through the middle ages, reached the Renaissance, passed through Protestantism, gathered every spiritual flower of the nineteenth century. Such long experience of the past, such knowledge of the attractions of humanity,—predicting its fulfilments,—carry the thinker equally far into the future. Knowing the angles of convergence in time's rising pyramid, he can calculate the apex, and look down from it. He is able to rejoice in realisations of ideals now mere tendencies. His immortality is present. Such to Renan meant that communion of humanity, into which he entered by patient studies, and by the devotion of his life to the spiritual essence of the world. And this vision sustained him in his last hour.

And let me here say, that Renan's optimism was not based in any belief in a superhuman providence, or any dynamic or compulsory destiny in nature. It was his faith in the heart and brain of man. In his last work he reminds youth that their efforts at new abstractions and theologies are idle: the new notions will follow the old into extinction. "Dear children," he says—

"Dear children, it is useless to give yourself so much headache to reach only a change of error. Let us die calm, in the communion of humanity, the religion of the future. The existence of the world is assured for a long time. The future of science is guaranteed, for in the great scientific book everything adds itself and nothing is lost. Error is not deep; no error lasts long. Be tranquil. Before a thousand years, let us hope, the earth will find means to supply its exhausted coal, and, in some degree, its diminished virtue. The resources of humanity are infinite. Eternal works accomplish themselves without loss to the fountain of living forces, ever rising again to the surface. Science, above all, will continue to astonish us by its revelations, substituting the infinite of time and space for a poor creationism that can no longer satisfy the imagination of a child. Religion also is true to the infinite. When God shall be complete, he will be just. I am convinced that virtue will find itself one day clearly to have been the better part. The merit is in affirming duty against the apparent evidences. [As for the future] denying not, affirming not, let us hope. Let us keep a place at our funerals for the music and the incense."

It will be seen that Renan's deity is the brother of man's divinity. God is as dependent on man as man on God. Natural evil is God's incompleteness: when man is complete God will be complete: there will be no more injustice.

But I must warn you that while this is the way in which Renan impresses me, he is not a man to be caught or held in any one theory. He is the many-sided man of our time. When I heard his lectures in his college, two years ago,—his French was so clear and expressive that even a limping listener could follow him tolerably,—he impressed me as a sort of Buddha. Buddha is supposed by some to have got his large form by sitting so long in contemplation, by others his size is regarded as a protest against the meagreness of ill-fed ascetics. The unfurrowed serenity of Buddha's face, his infantine smile, were those of Renan, also the remembered music of his voice. This association has been extended to Renan's spiritual nature by a letter of his to a friend, in his "Feuilles Détachées." He is fascinated by the legends of Buddha and Krishna which describe them as multiplying themselves. When Buddha was born into this world, ten thousand women entreated to be his nurses, and Buddha multiplied himself into ten thousand babies. Each woman believed that she alone had nursed the true Buddha. In the legend of the god Krishna, he first appeared to some shepherdesses who were dancing. The beautiful god multiplied himself into as many forms as there were maidens, so that each believed that she alone had danced with Krishna, and through life kept her heart sacred to him. Writing of these legends, Renan says:

"The ideal loses nothing by dividing itself: it is entire in each of its parts. We live that part of Krishna which we assimilate according to our genius. The ideal is for all partakers, like morsels modified to each taste. Each creates his divine dancer. One refinement I would introduce into the legend of Krishna, should I ever make it into a drama, or, better, a philosophic ballet: at the time when the shepherdesses believed they were singly dancing with Krishna, he should find that they were in reality dancing with different Krishnas. Each had made her Krishna to her fancy, and when they came to describe to each other their heavenly lover, they should find their visions in nowise alike; and nevertheless to each it was always Krishna."

The legend which thus charmed Renan has many correspondences in religious history; in Christianity, for instance, where we to-day find a hundred and fifty sects, each believing that it alone has the true Christ for partner. But it applies to all great personalities, and to all spiritual influences. The finest spirits frame no

systems, found no schools. They are akin to the sun and rain which nourish and paint innumerable and diverse growths. It was so with Emerson. Dean Stanley said that he heard many different preachers in America, but their sermons were generally by Emerson. It was preëminently the case with Renan. The Catholic, the Protestant, the idealist, the sceptic, the man of the world, the mystic, the conservative, the radical, provided they are unsophisticated like the shepherdesses, not champions of some sect or party, find that Renan has spoken better for them than they can for themselves; he knows their secret heart, is their partner by unbounded sympathies. Yet it is always the same Renan, full and entire in each and all of his manifestations.

Some time ago, when his friend Littré, the Positivist, was buried by his family with Catholic rites, the aspersoir passed round the grave, and came to Renan, who, like the rest, sprinkled holy water on the coffin. There were cries of "Shame" among the freethinkers present; but really it was the act of a man less sectarian than themselves. The same tenderness that could not wound the family parting for ever from their beloved, is visible in the gentleness with which he treats old beliefs, when it is a question of affection or sentiment, not of dogma and authority. They have died out of his mind utterly; he sees the creeds already in their graves; he no longer fears them, but is glad to soothe those who cling to their lifeless forms by speaking kindly of their virtues in the past. His "Life of Jesus" is, in large part, a wreath of immortelles laid on the tomb of a faith to him utterly dead,—that is, faith in a supernatural Christ. He once told me of a little island on the coast of his native Brittany, from which some medieval saint was supposed to have driven monstrous serpents, or worms. To that island the peasants still repair to get a little of the soil to use as a—vermifuge. To similarly small size had shrunk, in Renan's view, the greatest dogmas and superstitions of Christendom. Others might still compliment them with fear and wrath, but Renan was tender to them because of their smallness. He was endlessly good-natured with his ignorant opponents, from whom he often received warning letters. Of one who wrote him simply the words, *Remember, there is a Hell,* he said that this

monitor did not terrify him as much as he may have supposed. He (Renan) would be rather glad to know for certain that there was beyond the grave even a hell. And if he should go there he felt certain that he would be able to address to the deity such subtle arguments to prove that he ought not to remain there, but to be transferred to paradise, (only he feared his exhorter's paradise would be very dull,) that he would presently be released.

One purpose of the "Life of Jesus" has been mentioned, but that work had also another and a higher aim. With a love like that of Mary Magdalene, in whose rapt vision Jesus rose from the tomb, to be transformed into a supernatural Christ, Renan sought to raise out of the grave of that supernatural Christ the human Jesus. He had travelled through Palestine, visited every spot associated with the great teacher, and drew the most realistic portraiture he could of the parents, home, friends, disciples, and daily life of Jesus. The outcry against that book was a confession by theology of its utter loss of the human personality of Jesus. There had been a time when the religious heart loved to dwell on the sweet humanities of Jesus. In the seventeenth century the poet, Thomas Dekker, wrote:

> "The best of men
> That e'er wore earth about him was a sufferer;
> A soft, meek, patient, humble, tranquil spirit,
> The first true gentleman that ever breathed."

And such remembrance of Jesus, in his life among the people, his friendships, smiles and tears, are found in the sermons of Tillotson, South, Jeremy Taylor. But the descended God gradually consumed the humanity. In the last century it became a heresy to consider Jesus as a man. The man was crucified on a cross of dogmas; he lay dead and buried under a stony theology, until Renan rolled away the stone, raised him to life, clothed him with flesh and blood, invested him with beauty, and said once more to the Pharisee, the sceptic, the scoffer—*Behold the man!* For writing that book,—just after Strauss had shown the Christ of Christendom a mythological figure,—the churches should have clasped Renan's knees. But for it they heaped him with abuse, declared that Jewish bankers had bribed him to write it, drove him from his professorship of Hebrew,

reduced him to poverty. The Pope denounced him as "The European Blasphemer." He has been terribly avenged in his own country, where every educated man has abandoned the church. And he lived to see the Christianity of England striving to gain a new hold on the people by following his brave gesture,—rationalising away the supernatural Christ, and exalting the humanity of Jesus as the sign of his divinity. The criticism of that work is not at all so destructive as that of many who have written in the generation that has elapsed since its appearance,—of Dr. Martineau, for instance, on whom Oxford has conferred a doctor's degree. Indeed, in reading Renan's "Life of Jesus" now, one is surprised by its concessions. He accepts the four Gospels as coming from the first century, a belief which even the learned theologians have abandoned. Some newspaper has said that Renan borrowed from Strauss; on the contrary, the fault of the book is that it did not borrow from Strauss, and from English authors, who had proved that the Gospels are all of the second century. That would have relieved him of the necessity of apologising for Jesus in some matters of which Jesus never heard, of which Paul in the first century knew nothing, as when he intimates that Jesus may have once lent himself to an amiable deception. No miracle was ever ascribed to Jesus by any writer of his own century. In several other respects Renan's "Life of Jesus," on its negative side, is behind the advance of research and criticism. But those are small details compared with the spirit and general purpose of the work. In this moment, when we are celebrating the discovery of a western world, we may well pay homage to the scholar who rediscovered and exhumed an eastern world, long buried under débris of mythology and rubbish of superstitions. This Renan has done in his series of works on the "Origins of Christianity," beginning with the "Life of Jesus," dealing with the "Apostles," with "St. Paul," with "Antichrist," and other studies, leading up to his "History of the People of Israel."

In all these works there is not a line that is not interesting, alike to learned and unlearned. As some one has said, Renan could make Hebrew roots blossom with roses and lilies. But that superfine art of his was carrying the cause of intellectual and religious

emancipation. For these works concerned the constitution of Europe. This Great Britain, with all its physical freedom, is religiously a mere dependency of Judea. Here men were formerly burnt, until lately imprisoned, and even now denied equal advantages, not in accordance with what Englishmen think, but with the opinions of some ancient Jews. The voice of the Jews was the voice of God. But Judea, like the Grand Llama, could rule only while veiled. Renan unveiled it. He did it all the more effectually because in the literary and philosophic spirit. All the ages of Judea, from the first tribal groups to the movement of John the Baptist and Jesus, are assigned their exact place as successive chapters of human history, the natural origin of their mythology is explained, Jehovah takes his seat beside Jupiter and Brahma, Jesus is revered with Buddha and Zoroaster; and all this is done, not by mere opinion, but by impregnable facts, unwearied researches, inflexible veracity. It was also done lovingly. A superstition can survive combat, but not explanation. Renan did much to remove Christianity from the field of militant camps to the quiet province of literary investigation. In the Republic of Letters there is no arbitrary authority. The combat is left to salvation armies,—"theirs not to reason why."

There is a large Renan literature. More than three hundred works represent the efforts of theology to get the resuscitated human Jesus back into his grave again. Renan's accessible life-work is represented by about twenty-five volumes, of which some are philosophic diversions written amid the heavy labours of his College, and while collecting and preserving for scholars the whole body of Semitic inscriptions. For more than twenty years Renan has been training the young scholars of France—those who are to fashion France in the future, and influence mankind. Those acquainted with his larger works can realise his immense service in elevating the standard of criticism, and establishing the method of exact research and exact thought. But there are other works of Renan, notably his *Philosophic Dramas*, not yet translated, from which may be better gathered the great variety of his ability, the poetic play of his genius, and the charm of his personality, which some of us have personally felt, and which so won all hearts that even the priesthood

have not raised discordant notes in the homage and emotion with which his nation has laid him in an honoured grave.

Farewell, great heart, and great leader! On your coffin I laid a wreath of immortelles for friendship, for the homage of America, and for the sake of this free English Society. For your victory is ours also: your triumph is that of every independent mind on earth.

MONCURE D. CONWAY.

INTUITION AND REASON.

THE question whether we act more frequently from intuition or reason, and the question that follows it, which faculty is the more noble guide to conduct, would have no more interest for the general public than any other of the subjects which the metaphysician exercises his ingenuity upon,—than the question, for instance, whether we execute a greater number of analytic or of synthetic judgments in the course of the day,—were it not that there is an ancient opinion to the effect that reason and intuition are marks respectively of the manner of working of men's and of women's minds. The opinion is wholly unfounded, and could only have had its origin at a time when the psychology of the working of the human mind was thoroughly misunderstood. As the very terms in which the opinion is expressed make plain, it dates from the period when it was the custom to speak of the human mind as having a lot of separate "faculties" under its control, and of calling up now one and now another of them to do its bidding. It is time that the belief in the different quality of men's and of women's minds should follow the whole antiquated machinery of "faculties" into the limbo of old and worn-out fashions of thought and of speech.

This illusion, however, like most of the illusions that have had a firm foot-hold in their day, has a perfectly comprehensible reason for its existence. It is not true that men's minds and women's minds have a different way of working; but it is true that upon certain occasions (and by far the greatest number of occasions) we all —men, women, and negroes alike—act from intuition, and that the circumstances of women's lives have hitherto been such as to make their interests lie somewhat more exclusively in those regions in which

conduct is intuitive than in those in which it is long thought out. It is not true that the Creator has made two separate kinds of mind for men and for women; but it is true that society, as at present constituted, offers two somewhat separate *fields of interest* for men and for women, and that the nature of their conduct is of necessity determined by the character of the action which is demanded of them.

What is the difference for the psychologist, between the mental state of a being who acts from reason, and of one who acts from intuition? It is not a difference of the *kind of mind* which controls him, but of the *kind of knowledge* upon which his present conduct is based. If one individual has got at his command a lot of general propositions bearing upon the case in hand, and if his familiarity with them is not such that they flow together without conscious effort, then he must laboriously piece them together, and think out the conclusions which they necessitate. If another individual, having led a different life, has had a lot of experiences which cover just such cases as this, and if he has been taught by thousands of instances that under these circumstances a certain course of conduct will nearly always lead to good results, then he can trust to his hands or his feet to execute that course of conduct without a moment's aid from conscious reflection; he can go on with his novel, or whatever other pleasant occupation engages his attention, without the wear and tear of mind which is involved in consciously thinking about the circumstances in question.

Now the differences in the mental processes of men and women are exactly of this nature. They are differences dependent upon the fact that the *knowledge* at their command—that is, the stored up premises upon which action is based—is, to a certain extent, of a different kind, and got from different sources. So far as the knowledge is not of a different kind, the character of the action is not of a different kind. There is an immense number of conclusions which men and women alike "jump at," every hour in the day; and some of them represent reasoning so fixedly instinctive, that even the closest attention does not enable us to drag it up into the light of consciousness. How many people know that a certain feeling of strain in the muscles which move the eyes is a sign of a certain dis-

tance of an object looked at, and a different feeling of strain, a sign of a different distance; and that when the eyes are fixed upon one point, objects in the lateral field of view are judged to be nearer or farther away than that point, according as the two disparate images which they cast upon the two retinas are, the right-hand one or the left hand one, the brighter? The common man *knows* that one object is near and the other far, but he is not *conscious* even of the feeling of strain, nor of the existence of double images; the physiological psychologist knows the unconscious syllogism by which he *must* reach his conclusion, but even he cannot, by any possibility, make it cease to be instinctive,—that is, make himself conscious of its different steps. On the other hand, no one, whether man or woman, can pass from one proposition in geometry to another by a process which is in any sense unconscious, though one person may be obliged to give a much more strained attention to what he is doing than another.

Now it is very possible that a greater *number* of the actions of women have their ground in unconscious causes than of the actions of men. The subjects upon which action is of vital concern to them have been different subjects, and hence their stored-up stock of knowledge is knowledge about different subjects. To the woman of the past, who was to a great extent confined to her own home, the temper of her house-mates was what her happiness depended upon more than anything else in the world. It was impossible that she should not acquire a keen intelligence in interpreting every slightest shade of expression upon the human face. But this sort of knowledge is always instinctive, whether it is practised by men or by women. If the eyes of the most reasonable man in the world should chance to show him a certain curve of the lip and a certain elevation of the posterior angle of the alæ of the nostrils on the face of the fair lady to whom he was talking, would he try to call to mind the pictures in Sir Charles Bell's great work on expression and the general theorems in Darwin's book on the same subject, and piecing this and that laboriously together, would he try to arrive at some just conclusion regarding the contents of the fair lady's mind? Would he not, rather, instinctively change the subject of conversa-

tion, or even discreetly beat a retreat, long before he had time to *think?* Women's interests have been so exclusively social that they have developed a sense for the physical expression of emotion which makes society for them a matter of complicated relations, of delicate susceptibility to play of feeling, which—except in the hyper-sensitive period of courtship—is not common among men. But there are men who are quite the equals of women in this respect; and if any man is markedly deficient in these qualities, we recognise him as belonging to a low and brutal type which is in process of extinction. If a woman on the other hand, goes into business, she does not fix the prices of her straw hats each morning in accordance with the feelings which straw hats awaken in her when she first looks at them, but in accordance with the fluctuations of the market. The President of a New Hampshire Street Railway did not carry through her improvements by her intuitions, but by a plain, common-sense weighing of reasons. Nor are all masculine occupations under the guidance of the reasoning faculty. If you go to a stove-man and ask him to mend your smoking chimney, does he do it by reason? Not a bit of it! There may be stove-men who have enough knowledge of the laws which regulate the movements of masses of hot air to be able to apply general principles to particular instances, but in the course of a long and checkered experience with stove-men, it has not been my lot to fall in with them. Their knowledge of chimneys, such as it is, is got by experience and applied by intuition, and nothing is farther from their minds than any trace of deductive reasoning. It is not that there are men's minds and women's minds, but that there are theoretical subjects and practical subjects, and that knowledge is not the same kind of knowledge in both.

Intuition, in the sense in which it is used when discussing male and female minds, is a word of double meaning: it covers those actions which we go through with by instinct, or inherited experience ingrained from the beginning in our nervous structure, and those which we perform automatically, or by individual experience become so familiar that it can act as a guide without the aid of conscious reflection. The relative distances of objects looked at we know instinctively; the trained musician with mind intent upon ex-

pression, reads his notes automatically; the beginner at the piano goes through a painful process of syllogism before each key is struck. All is, at bottom, reason; in one case it is conscious; in another it is unconscious, but can be forced into consciousness; in another, it is unconscious and cannot by any effort be made conscious. Because a woman's interests lie more than a man's in regions in which thought is instinctive and automatic, it does not follow that she has developed any peculiar powers of intuition. Nor is there any possibility that mothers should occasionally transmit their powers of intuition to favored sons, as Mr. Grant Allen, in the course of his apotheosis of the uneducated woman, has somewhere suggested; some men have poetic and æsthetic minds, and in regions of poetry and art mental activity is largely of the instinctive kind. It is different with powers of reasoning. Good powers of reasoning may be transmitted from mother to son, but that is merely saying metaphorically that a good firm texture of mind may be transmitted. Hume and James Mill are two men who are supposed to owe much to their mothers, but their peculiar powers are not usually considered to lie in regions of intuition. No mother has ever produced an intuitive mathematician. Nor would any one who knew anything about the higher mathematics for a moment suppose that when a great mathematician leaves out intermediate steps in a printed book, he had jumped at his conclusions by instinct. It is simply that, with his thorough knowledge of this particular subject, the intermediate steps have seemed to him too easy to set down. If his book is hard to read, it is simply because he has assumed a greater amount of learning in his readers than they are in possession of.

The question whether intuition or reason is the nobler faculty is an exceedingly meaningless question. All knowledge which finds frequent occasion to be put in practice has a tendency to become first automatic and then instinctive. Human progress consists in making conscious action automatic as soon as it can be done with safety, and in setting free consciousness to attend to more and more complicated combinations of circumstances. After the musician has learned to read his notes mechanically, shall we urge him to go back to the period of conscious linking of note to key, because rea-

son is a diviner gift than intuition? Is it desirable to turn the act of walking into a conscious fitting of muscular tension to variations in the position of the centre of gravity in order to distinguish ourselves the more effectually from the brutes that perish? Reason is merely intuition in its formative stage, and the sooner all our present reasoned convictions become mechanical, and conscious thought is set free to bring in more and more far reaching considerations to bear upon our actions (including in that term our conclusions), the sooner will a higher form of life be reached.

Wundt's students have made some experiments in his laboratory in the last two or three years, which throw a great deal of light upon this question,—they have caught automatism in the very act of formation. It has been noticed that different observers differed very much in the reaction time which they assigned to the several senses,—that is, the time required, for instance, to hear the tap of a bell, and to press a button in response. Wundt's students found that there are two different reaction times,—in one, time is taken to bring the tap of the bell into the focus of consciousness and to decide consciously what to do in response; in the other, the process is unconscious. The first is nearly twice as long as the second, and both are very constant quantities, for the same sense. The exact figures are, in seconds:

	FULL.	SHORT.	
Sound	.216	.127	N. Lange
"	.235	.121	Belkin
"	.230	.124	L. Lange
Light	.290	.172	L. Lange
"	.291	.182	Martius

It may be inferred from this that, even in the simplest matters intuition is very nearly twice as valuable a "faculty" as reason, as far as economy of time is concerned. (It would be interesting to determine the difference in fatigue.) But the interesting point is that the experimenter can teach himself to give either reaction time at his pleasure. If he thinks of his ears, he has a feeling of strain in them, and a long reaction time; if he directs his attention to his fingers (or if he thinks of indifferent matters) he is unconscious of

what is going on, and his reaction time is short. It is plain that the more of these educated brain-reflexes we can produce, the fuller and more complicated lives we shall be capable of carrying on. It may also be assumed that the ideal human being is the one who has many brain-reflexes, but who is capable of bringing them all into consciousness upon occasion. Connections that we cannot make conscious are a frequent source of illusion. When we move the eye-ball about by the will, objects seem to remain stationary; but when, putting the finger on the under eye-lid, we push the eye-ball up and down in the socket, we cannot help *perceiving* that objects are moving up and down. Prof. William James suggests as a good experiment that some one who has eyes that he is not afraid of injuring should do this pushing several hours a day, and see if he cannot force conscious reason to do her work and to make him *see* that the objects are not moving.

For perfectly regular circumstances,—that is, for the world of nature or of human character so far as is governed by fixed laws,—reflex action presents an immense economy of time and work. To provide against extraordinary emergencies, it would seem to be desirable that we should have the power of interposing consciousness in the chain which begins with stimulus and ends in action. Whenever a large number of considerations, or considerations of an abstract character, have to be weighed and balanced, then reason is the only sufficient guide.

That women have no deficiency in the power of putting this and that together, when *this* and *that* are pieces of knowledge which are in their possession, is absolutely proved by a single circumstance. Geometry is a branch of learning which is entirely built up out of abstract reason, pure and undefiled. Geometry is studied, in the United States, in high schools, and it must not be forgotten that there are in this country (according to the Report of the Bureau of Education) *three times* as many girls as boys who take the high school course. It cannot be said, therefore, (as is said of girls who go to college) that the girls who go to the high school are a selected lot; they are the very bone and fibre of the women who make up the country. Now if women could not reason, we ought to hear a

great hue and cry from the teachers of the geometry classes about the difficulty of teaching that subject to girls, and the girls ought to lament and moan over the impossibility of getting safely through with their demonstrations. Is this the case? I have never met with a teacher of geometry who thought his boys did better than his girls, —I have met with several who thought the reverse. As long ago as 1865, Her Majesty's Inspector of schools, after travelling through this country, said: "The teachers all tell me that the girls do fully as well as the boys in mathematics,—fully." Nor are any sad effects noticeable upon health or spirits. Day after day an army of girls goes smiling into the class-room and comes smiling out, utterly unaware that an unnatural wrench has been given to their delicate minds, and that they are being rapidly transformed into monstrous products of over-reason.

If girls show no defect in reason in the class-room, neither do boys show any defect in intuition,—in fact, their intuition about stretched strings and lines on balls are usually better than those of girls. I have kept a record for many years of errors committed by boys and by girls, and I have not been able to detect any difference in their character. It is true that it was a boy who once failed to get a problem in trigonometry for a week, because it was not expressly stated in the book that the milestones to which the problem related were a mile apart. My intimate acquaintance with the character of his mind prevented me, however, from attributing this failure in intuition to his superior reasoning powers.

The simple matter is that a good *mind* has good reasons and good intuitions both. Both qualities are summed up in the expressive popular phrase, "having your wits about you." If you are in full possession of your wits, you will trust to your instincts, when you must; to your acquired reflexes, when there is no sign of danger; and to your reason, when the question requires debate. It would be greatly for the good of the race if the common virtues should become more instinctive in men; and if women should be put into a position in which they can reflect more wisely upon the virtues which are only just in process of getting known to be such. The only reason that women do not guide themselves by far-reaching

principles in their every-day conduct, is that they have not made themselves acquainted with the doctrines of political economy and of abstract ethics. When women are in full possession of the higher education, there is no danger that they will not put it into practice, so far as it leads to practice. The human mind is so constituted that it cannot help taking account of all its knowledge. Propositions merely learned by rote, or the truth of which it is not absolutely convinced of, it may leave one side, but not what it really *knows*. Nor is there any danger that woman will lose her powers of intuition. The knowledge and skill which she has acquired in social matters will not desert her because she has made herself familiar with the speculations of philosophers, and can turn to them for guidance in the intricate questions of conduct which the complexities of modern life give rise to. So long as a woman's highest duty was to please her lord and master, her task was simple, but women are now awake to a sense of wider responsibilities. They are now aware that it is their highest duty *to be* the best possible kind of a human being, and *to do* whatever lies within their strength towards making the world the best possible kind of a world to live in. For this end they have urgent need of *all* the gifts that God has given them; and he who would cripple their reason on the ground that intuition is a pleasing and a poetic guide, would do them a grievous wrong.

CHRISTINE LADD FRANKLIN.

CRUELTY AND PITY IN WOMAN.

I.

CRUELTY.

SPENCER says* that among savage nations the women are as perverse as the men, and that if they do not work so much evil it is because they are less able to do so. This is not entirely true; doubtless women among savages are much more inclined to cruelty than to pity, but, generally speaking, woman even at the very beginnings of human evolution is less cruel than man.

WOMAN AND WAR.

Woman, even among savage nations, is rarely a warrior. In the Antilles, the women watched over the safety of the islands whenever their husbands went to war with the neighboring islands; they were brave, strong, courageous, nearly equalling the men in their cleverness in handling weapons.† Amongst the ancient Bretons, armies were always commanded by women. In Dahomey, the élite of the army is composed of a troop of six or seven thousand Amazons, who are very ferocious, particularly in the mutilation of dead bodies; women then become tigers, is a popular saying. Among the ancient Scots, women followed the army, and cruelly mutilated the prisoners. Among the Botocudos, when war breaks out between the tribes, the men fight the men with sticks, and the women fight the women, by scratching and by tearing the *botoques* (cylinders of wood) from their ears and lips.‡ But these are all exceptional cases.

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* Spencer. *Principles of Sociology*, II., p. 361.

† Irving. *Hist. of the Life and Voyages of Chris. Columbus*, II., p. 15.

‡ Hovelacque. *Les débuts de l'humanité*.

Generally speaking, the savage woman plays a secondary part in war; she acts as an auxiliary, picks up arrows, throws stones from a distance, and carries the provisions etc.

REVENGE.

It is above all in revenge, that feminine cruelty shows itself the most terrible. Man is capable of destroying whole families or nations, to satisfy a particular revenge; but nothing equals the ingenuity of woman, in slowly tormenting her victim, in gloating over his sufferings and lengthening them out in order that her enjoyment of vengeance may endure as long as possible.

In Tasmania, when the *black war* broke out between the English and the aborigines, the Tasmanian women terribly tortured the prisoners, in order to avenge their companions who had been carried off by the English. We must also attribute to the desire for vengeance, the torments inflicted by the women upon prisoners of war among the Red Indians.

Elizabeth of Russia, betrayed by her lover, obliged him to marry a deformed dwarf, and to pass his wedding night in an ice palace, where the furniture and the bed were all of ice. The next morning, attended by her Court, she went to present the newly wedded pair with a bouquet. She found them, stretched out upon their bed of ice, nearly frozen. She then banished her rival to Siberia first causing her ears and nose to be cut off.

A wealthy Russian Prince, in love with a very beautiful peasant girl of fifteen, took her to live with him for five years; at the end of which time, wishing to contract an alliance, he paid her a sum of money in dower and obliged her to marry a peasant. The young girl made no sign for ten years, until the death of her husband; but after the lapse of that period, a rising having taken place among the peasantry against the nobles, she excited them and led a body of peasants to the castle of her ancient lover, had him taken and dragged into his *izba*, harnessed him to the plough instead of the oxen, and for three days obliged him thus to work, lashing him with the whip each time that he fell to the ground. At night she led him to the stable and made him lie down with the oxen; compelling him

to eat fodder with the beasts and making merry over his sorry plight. This amusement lasted for three days, at the end of which time, the man fell dead in one of the furrows he was ploughing.*

A Russian, an idle and worthless fellow who had let his wife suffer hunger, proposed to her that she should be sold as a slave to the Sultan. After some hesitation, she accepted and they started off; but when they had gone about half the way, the husband having fallen asleep intoxicated, the idea came into her mind to sell him for a slave, in her place. She then tied him on the horse, started off again on the road and arriving at the place of rendezvous, she delivered her husband to the merchant, and remained to watch the Turk push the half-awakened man into the boat, laughing whilst he showered blows upon him.†

A young Russian peasant woman lived with a small land-owner, who betrayed her; at last she took refuge with a band of brigands, who treated her like a queen. One day she caused two of them to capture her old lover, and had him brought to the camp where she used him as a kind of living foot-stool: when she sat down she covered him with a carpet and put her feet upon him, and when she wanted to go out she made him carry her on his shoulders.

CRUELTY TO THE HELPLESS.

Woman sometimes displays the same amount of ingenuity in tormenting the helpless creatures who may be in her power. I do not know, says Bourgavel, any one more perfidious, immoral, or perverse than the New Caledonian woman. In certain portions of Australia women are mortal foes to each other. When the men wish to punish any one of them, they turn her over to her companions, who inflict upon her horrible tortures.‡ Sitting on her body, they cut her flesh with sharpened stones.

In Tasmania, as amongst the ancient Saxons, the unfaithful wife was punished by her companions; she was not killed, but

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* Sacher-Masoch. *Rev. des Deux Mondes.*
† Sacher-Masoch. Ibid.
‡ Letourneau. *Evolution de la Morale*, p. 122.

she was tortured for a long time with sharp pointed stones or knives, in all parts of her body.

Women have often been cruel mistresses to their slaves. A lady in Guiana, being envious of a very handsome mulatto slave, had her branded on the mouth, cheeks and forehead. In the case of another slave, who was also very beautiful, she had the tendon of Achilles cut thus causing her to become a deformed and crippled monster.*

It is a notorious fact that Roman and Greek ladies often inflicted most terrible punishments on their slaves, and that it was more particularly towards the female slaves, the *ancillæ*, that the cruelty of their mistresses was shown. The Roman ladies, if, while they were having their hair dressed, they were vexed with their attendants, used to thrust pins into their arms and breasts. Darwin relates that at Rio Janeiro, an old lady possessed a kind of thumb screw which she had had made expressly to crush the fingers of her slaves.

EPIDEMIC CRUELTY.

During periods of great national excitement, such as revolutions, feminine cruelty shows how far it can go.

The women, writes M. Du Camp, were the fiercest heroines of the Commune; it was a woman who incited the assassination of the Dominicans. When the hostages were shot, they surpassed the men in cruelty; they taunted them with not knowing how to kill. When employed to seek out the insurgents they were implacable; when acting as infirmarians, they killed the wounded by giving them brandy to drink.

At the time of the French Revolution, on the days of execution, writes M. Legouvé,† the front rows nearest the guillotine were reserved for the women of the political clubs. They even hung on to the boards of the scaffold, in order the better to witness the death throes of the condemned, and drowned the cries of the victims by their peals of laughter.

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* Mantegazza. *Fisiologia etc.* Milan. 1889.
† *Histoire morale des femmes.*

II.

PITY.

But again we find a series of contradictory facts, which bear witness that the sentiment of pity also is much keener in woman than in man.

Even with animals, we observe this phenomenon. Hens often separate two young cocks who are fighting together. Sir George Le Grand Jacob has observed females of the wild goat (Steinbock) raise with their heads he-goats that had been shot, support them and help them to escape. Romanes relates, that sometimes the female gibbon, takes great care of all the members of the troop when they are wounded, even if they are not related.*

The savage woman also is very often kind and good. It is notorious that the explorers of savage countries have often escaped serious perils, thanks to the kindness of the native women. Australasian women have often revealed to European travellers the plots laid against them by the men of their tribe: they have even risked their own lives for that purpose.† Stanley, at the island of Bambyrch, on the Nyanza, was roughly greeted by the natives, who were desirous of exterminating his expedition; but a woman came to warn him and to advise him to perform a certain ceremony with the King Shekka by which he would acquire his friendship. In Senegambia an old woman, meeting Mungo Park, who was half dead of starvation and had just been despoiled by a negro king, gave him food, and went away without waiting to be thanked. Another time the same traveller, being left with nothing but his saddle, was hospitably entertained by some women, whom he heard chant these words as he fell asleep: "The winds roared and the rain beat, the poor white man came and sat down under our tree, he had no mother to give him milk, no wife to grind him corn. Let us take pity on the white man, he has no mother, etc., etc."‡ Michelet says that woman

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* Romanes. *Animal Intelligence*, Vol. II.

† Hovelacque. *Op. cit.*

‡ Letourneau. *La Sociologie d'après l'ethnographie.* Paris, 1884.

was the first physician; and certainly she fulfils the office of infirmarian among many savage peoples, the Esquimaux, the Mincopies, etc. etc.

In war the Samoan woman often interferes to make peace between the belligerents. Among the Khonds, also, when two tribes quarrel, the women sometimes make peace, calling in the intervention of a third tribe. Quite recently, among the Montenegrins and Albanians, fierce strife broke out between different families, but in these fights, if a man took refuge with a woman and she covered him with her apron, he was safe. Among the Bedouin Arabs a woman can save the life of the condemned man who implores her protection. So it also was among the Roman Vestals, when in the streets they accidentally met a man condemned to death; it was required, however, that the meeting should be evidently a chance one, for it was feared that the privilege might be carried too far. Among civilised nations this sentiment of pity becomes naturally more developed. Christianity owed a great deal of its success among women to the fact, that it knew how to make use of their pity, by organising those associations of women which are its greatest ornament. From the earliest years after the death of Jesus, in the cenobitic form of society lived by the disciples of the Messiah, they made use of the charitable sentiment of childless widows and created the order of Deaconesses, which was devoted to the care of the poor and the sick.* Legouvé says: "Women offered their services to Christianity like a volunteer batallion consecrated to charitable work. In the Apostles' time their mission was one of sympathy and watchfulness, a mother's vocation; in the time of the Martyrs they remained womanly in their modesty, while exhibiting a manly courage; in the time of the Doctors, whilst orators speak and learned men write, women continue to love and console."†.

This Christian tradition has survived and is still powerful, thanks to the deeply laid sentiment of pity in the heart of woman. "Private charity in Paris," writes M. du Camp,‡ "is almost entirely

* Renan. *Les Apôtres.*
† Op. cit.
‡ *La charité privée à Paris*, 1887.

in the hands of women. There are in Paris women of the world, young and beautiful, born for pleasure, accustomed to every luxury, who visit the poor, nurse the sick, rock little motherless children, and all this they do simply without a word of self-praise.

The society of "Les Dames du Calvaire," in Paris, is composed of widows, who, without binding themselves by religious vows, engage to nurse the sick gathered into the hospitals of the association, poor outcasts attacked by loathsome diseases—cancer, for example. Women of wealth and belonging to great families often obtain admission to this society. Female religious orders are rarely contemplative; they are nearly always charitable in aim. "The Daughters of Charity" possess establishments all over the known world; they migrate, says M. du Camp, "like benevolent birds, carrying with them the principle of self-sacrifice and the love of those that suffer. In all countries I have visited, among sects most antagonistic to their religion, I have beheld them at work; their faces shadowed by the immense cap, which resembles the wings of a white swan; instructing children, visiting the sick, caring for the plague-stricken, blessed by our sailors whom they nurse in the French hospitals in foreign lands." *

Pity in woman is sometimes so powerful a sentiment that it supplies the place in her of a higher faculty, intelligence. It was thus that a humble servant-maid, without learning, who could neither read nor write, founded one of the most prominent nursing sisterhoods in France, "Les petites Soeurs des Pauvres," which to-day numbers 3,400 sisters, and possesses 207 houses, where more than 25,000 old men are received and cared for. In the first half of this century there was such misery in Brittany that the old men were literally abandoned by all. Jeanne Jugau, whose earnings hardly sufficed to maintain herself, took in one, then two, then a number of them, without a thought of her own poverty, slaving might and main for their support. Two women, Virginie Tredaniel and Marie Catherine, helped her; a priest, Le Pailleur, took the direction of their work, and in a short time the order was founded, and grew apace. There, where

* Op. cit.

genius might have failed, the love and pity of a servant-maid succeeded.

Another heroine of charity, though of a different type, was Jeanne Garnier. She was perpetually haunted by a desire to do good, to help and succour the unfortunate. M. du Camp has portrayed her character in a most graphic manner: impulsive, prone from childhood to adopt extreme measures, while in the convent she was given to rebellious and untractable conduct, for which she was sent away. When she was twenty years old she married; the love she bore her husband and two sons was deep and ardent. Three years after her marriage she had the unspeakable grief of losing both husband and sons at one fell stroke. After this occurrence her life had but one aim, ceaselessly and untiringly to succour and help the sorrowful. One day she was told that a woman, disfigured by a cutaneous disease, was lying in an attic in Lyons, abandoned by every one. She went at once to her, ministered to her, and every day went to wash her sores. Thus was suggested to her the founding of the association of "Les Dames du Calvaire," of which we have already spoken, and the idea of pressing into the service of the sick, widows who found themselves in the same position as herself. She was not rich, but being an untiring and determined worker, capable of attacking the same person ten times a day, she obtained money. When they had to convey the sick to the new hospital, there was among them one woman so horribly disfigured by burns that no conveyance could be found whose driver was willing to take her. Jeanne Garnier then took her on her own shoulders and carried her there herself. The association of "Les Dames du Calvaire" was not the only charitable work which owes its existence to her. She conceived a great many other plans, of which many were carried out, for she never ceased working, up to the moment of her death, which occurred at forty-two years of age, of exhaustion.

In the United States, where woman enjoys much greater freedom than in Europe, she makes an excellent use of her liberty. In fact, all associations of women have a charitable end in view; and these societies not being subjected to the severe rules of Catholic religious orders, and not requiring from their members so absolute a renuncia-

tion of the pleasures of life, exhibit the most perfect and most modern form of charitable associations, which have been known up to the present day. The first woman's club that was founded in that country, the Sorosis, has for its object the amelioration of the condition of shop-girls: it has also founded asylums for homeless children. The Temperance Union, founded by women, seeks to stem the tide of intemperance. The Women's League has obtained the admission of women on commissioners' boards for schools and hospitals. The College Settlement Girls, composed of female graduates from universities, carry help into the purlieus of the city.*

CRUELTY, PITY, AND THE MATERNAL SENTIMENT.

Is woman kind or cruel? Can we reconcile these two series of facts, so contradictory in themselves? That is the question which now comes before us. Let us seek, first of all, the origin and the genesis of feminine cruelty. We have seen women exhibiting great ingenuity in torturing; she does not wish to destroy her enemies, but to torment and torture them; she seeks to protract their pain as long as possible, and to lengthen out her enjoyment of vengeance. On this point woman goes much further than man: for among savages men do not amuse themselves by prolonging the miseries of their enemies; they rather wreak their vengeance by killing them at one stroke. Savages often make a wholesale carnage, massacring whole tribes and nations. But it is always the woman who practices the art of killing a man by inches, over a slow fire, as it were. Thus we find that the redskins give their prisoners of war over to their women. Notice, even at the present day, the difference between the quarrels of men and women. Women scratch each other, tear out the hair, fly at the eyes of their adversaries, trying to inflict some painful wound: men give blows and stabs; they strive to disable or stun their enemy, or to destroy him. There is the same difference but on a smaller scale. This aptitude in inflicting pain is an outgrowth of weakness. We know from the Darwinian theory of

* *The Forum*. 1891.

natural selection, and from the struggle for life, that every living being must be provided with a certain number of means of defense and offense, and amongst these means must be classed many instincts and sentiments which spring from natural selection, adaptation, and heredity. The cruelty of woman is one of these instincts and sentiments. Woman not being powerful enough to destroy her enemies, had to seek for the means of defending herself, by wounding their more delicate organs, by inflicting such acute pain as would serve to disable them. This tendency to protect one's self by such means has become instinctive by heredity; and so much the more since the woman who was able thus to defend herself, had at the outset of man's evolution a far better chance of survival.

All this is so true, that we find other weak creatures also to be cruel. Children take pleasure in tormenting insects, birds, or little dogs, and are very cruel to each other. I knew a child who used to cut his nails like the teeth of a saw, in order to inflict more painful scratches on his companions. Humming birds, says Brehm, are the smallest and the cruelest of birds. When they are attacked by a more powerful enemy they try to peck out his eyes with their long, sharp beaks. The struggle for life and natural selection has provided their weakness with this means of defense, and they are even cruel to each other when they fight, to such an extent has the sentiment of cruelty in them become instinctive.

And now we must seek for the genesis of the other phenomenon, pity. It is a notorious fact, that maternity being the great function of woman, through the whole order of animal life, with the exception of some few fishes, it is always the female who is thus the benefactress of the race. Maternity is always an altruistic function; in the inferior orders this altruism is a purely physical act, and consists merely in a material sacrifice; (the detaching of a portion of the maternal body, under the form of bud, or egg;) in the higher orders, this altruism becomes psychical and consists in a conscious sacrifice of self and of vitality in the interests of the race.

What then is the essential nature of these altruistic sacrifices? Maternity is protection given to weakness; for the infant is above all other created things a being requiring succour.

It is thus that, the images relating to the state of weakness being in great numbers strongly impressed on the mind of woman, when one of them presents itself to her, by the law of association it awakens all those maternal sentiments whose function it is to help the weak. At first, motherhood only extends from a woman's own children to those of others; this is the first stage of pity, such as we find it in the animals and among many undeveloped savage peoples. Afterwards in a region of higher psychical development the sentiment of pity broadens till it embraces a wider group, the sick, the aged, those condemned to death; for all those unfortunates who claim the pity of woman are the weak appealing for help to the strong. It is only the weak who can inspire pity. Thus pity, in woman, is but the outgrowth of the maternal sentiment applied to a larger class of helpless people. "Woman," says M. du Camp, "may bind herself by the religious vow of chastity; but she is a born mother and remains a mother, even though circumstances may have broken the physical law of her sex. The Little Sisters of the Poor, call their pensioners 'the good little old men,' and themselves 'the good little sisters,' their superior 'the good little mother.' With them everybody is good and little; all these expressions are the reflection of maternal love."

We must mention also, that one cause of a livelier sense of pity in woman, is her own weakness and her lower intellect. "Anger," writes A. Bain, "the passion for war, are bound up with activity and strength; conditions of weakness and of repose are favorable to the softer sentiments." Strong men who display great muscular or mental activity, and who often experience the satisfactions arising from power, only realise with extreme difficulty the feelings of the weak; for, as H. Spencer remarks,* "to feel pity for any suffering which we witness, we must have experienced it ourselves to the same extent or in an approximate degree." Thus healthy persons become, after a serious sickness, more feeling than they formerly were for those who are suffering; women are continually in a state of ill-health.

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* Spencer. *Principles of Psychology*, II, p. 648.

Besides which women have not been involved in the struggle for life, as have men during the whole process of evolution: this struggle for life implying, as it does, the necessity of pursuing one's own object irrespective of the ills which it may entail on the unhappy competitors, and often rendering a man insensible to the sorrows of those around him. To this we add, that love for man has not been without influence in developing the sense of pity in woman. The main characteristic of the love of woman towards man, is self-abnegation and devotion; woman finds her happiness in devotion to the man she loves and in making for him the most painful sacrifices. Read the "Letters of Heloise," the "Life of Carlyle," or the "Life of Mme. de Lespinasse." Each woman, carries hidden in her heart, an inexhaustible treasure of devotion which heredity has added to through all the centuries, during which woman has lived in contact with man and sought to win his good-will, displaying an affection and an ardent zeal in his behalf; nothing then is easier than to spend this treasure on the unhappy, when she has not found the man on whom to lavish it.

The close relationship between pity, maternity, and love, is also shown by this fact, that the heroines of charity are almost always widows without sons, or unmarried women. When a woman has a husband or sons to love and cherish, she does not feel the same tenderness towards the suffering; this goes to prove that if these two sentiments are interchangeable, they are but two different forms of the same thing.

PITY AND CRUELTY.

We are now in a position to answer the question: Is woman kind or cruel? Pity and cruelty coexist together in her; we might call this state in woman a state of unstable equilibrium: to-day she is kind, divinely good, charitable; to-morrow she will be perverse and cruel. On one side her feebleness renders her cruel, and her impulsive nature prevents her from repressing the outbursts of anger and of vengeance; on the other hand, the gentle habits of maternal affection, her lower intelligence, and even the weakness of her nature develop in her kindly sentiments. Woman may experience the

strongest feelings of maternal affection at the sight of a helpless creature; but that will not prevent her from cruelly persecuting a rival, especially if she has been wounded in her sentiments of wife or mother. Thus woman, who is the natural protector of the weak, treats them oftentimes with a cruelty of which man is totally incapable. Woman loves, hates, consoles, inflicts pain, according as she finds herself in the presence of a friend, an enemy, a helpless being, or of a rival.

Many of the fiercest heroines of the Paris Commune, had been trained nurses during the war, and distinguished for their devotion to the sick. There is nothing astonishing in this, for contradiction in feeling is so often a psychical law that a great Italian philosopher, Robert Ardigò, has said that man is not a logical being.

We have noticed before that weakness is in part the cause of cruelty and partly also of pity, and this accounts for the coexistence of the two contrary sentiments. They coexist because they have a common origin. But this instability of equilibrium is lessened by evolution, and pity becomes stronger than cruelty. Among civilised nations the cruelty of women has become merely a moral attitude: the civilised woman, less powerful than her savage sister, no more subjects her enemies to physical pain, does not shed their blood; she contents herself with slandering them, turning them into ridicule, and humiliating them. The diminution of muscular strength is in itself favorable to the softening of female character.

Furthermore, sexual selection also helps in this; in the human race as civilisation advances the male assumes more and more the right of selection, and man shrinks instinctively from meeting in a woman a high development of the qualities which he himself possesses, for he wishes to dominate her and to be her superior. This explains to us the singular fact, which we notice every day, that of a *savant* marrying a stupid or unintelligent wife; this is why the normal man, as also the vicious, choose gentle and good women when they desire to found families. If sometimes the choice falls on a wicked woman, it is because the man desires to form a criminal copartnership, such as was perhaps the normal condition of family life during the early days of human evolution. Many of the domestic

tragedies which we witness to-day can be traced to no other cause than this *penchant* of the male, even of the vicious, to choose the woman who appears to be the most gentle. Women with their clear penetration and sure instincts have seized upon this inclination in man and made capital out of it with infinite ability: do we not see many young women simulate a gentleness, a sweetness, and kindness which they do not naturally possess in order to capture the good-will of men? Women have thus practised the habit of repressing their evil *penchants*, through interested motives, because they saw that men chose the most gentle among them as wives.

Besides sexual selection, physical grace plays a conspicuous part, as well as those psychical qualities which are associated with it. Man having set a high value on graceful demeanour, woman sought and still seeks with all her strength to adorn herself with it.

We know that by the law of association between the emotional states and their outward expression, which mutually correspond, each gesture, each attitude, and each graceful expression of the countenance has a tendency to throw the mind into some sweet and peaceful condition; this is why the culture of physical grace has been for woman an exercise of goodness. This fostering of physical beauty has had a beneficial influence on her moral character. We might say that as woman grew in beauty, she became better. Finally woman being in the present day more respected than in former times, she has less often the occasion to exercise her instinctive cruelty, which on this account is being gradually obliterated. Pity each day becomes more and more the normal state of the feminine mind, and cruelty the exception. In order to be cruel, a woman's character must be perverted, as is the case in female criminals, whose vice exceeds that of man in similar circumstances. Or she must have received some deep provocation, wounding her profoundly in her deepest and tenderest sentiments, which has awakened the original cruelty slumbering latent in the depths of her heart.

We may thus predict that in the ages to come, woman will become entirely good.

GUILLAUME FERRERO.

PANPSYCHISM AND PANBIOTISM.

I. PROFESSOR HAECKEL'S PANPSYCHISM.

PROFESSOR HAECKEL, in his article "Our Monism,"* propounds the theory of Panpsychism, which he considers as an essential feature of Monism. He says:

"One highly important principle of my monism seems to me to be that I regard *all* matter as *ensouled*, that is to say, as endowed with feeling (pleasure and pain) and with motion, or, better, with the power of motion. As elementary (atomistic) attraction and repulsion these powers are asserted in every simplest chemical process, and on them is based also every other phenomenon, consequently also the highest developed soul-activity of man.

"Simplest example: sulphur and quicksilver rubbed together form cinnabar, a new body of entirely different properties. This is possible only on the supposition that the molecules (or atoms) of the two elements if brought within the proper distance, mutually *feel* each other, by attraction move toward each other; on the decomposition of a simple chemical compound the contrary takes place: repulsion. (Empedocles's doctrine of 'the love and hatred of atoms.')"

Not being able to accept Professor Haeckel's doctrine of Panpsychism, I propose what might best be called Panbiotism, briefly set forth in the maxim *πᾶν βιωτόν*; that is, everything is fraught with life; it contains life; it has the ability to live.

The word *βιωτός* is mostly used by Greek authors in the negative, as in the phrase *βίον οὐ βιωτόν*, an unlivable life, in the sense of a life unendurable or not worth living. Thus Sophocles and others. The word *βιωτός* is embodied in the term Panbiotism in its etymological sense of "livable."

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* *The Monist*, Vol. II, No. 4.

I am willing to concede to Professor Haeckel that all nature is alive. Indeed, I have most emphatically insisted on the doctrine that there is a spontaneity pervading all nature. (See "Fundamental Problems," 2d ed., pp. 110 et seqq.)

By spontaneity is to be understood that kind of activity which springs from the nature of the being or thing which is active. A motion that is caused by pressure or push is not spontaneous; but a motion, the motive power of which resides in the moving object, is spontaneous. Thus a cart rolling down a hill by its own weight performs a spontaneous motion, but when drawn by horses moves, or rather is moved, by pull without any spontaneity.* Now everything that exists is possessed of certain qualities; its existence is of some definite, peculiar kind, and this its peculiar kind is the character of the thing. In the character of a thing lies the source of its spontaneous actions. The spontaneous actions of the chemical elements depend upon their qualities, which always react under certain circumstances in a definite way, and under the same conditions in the same way. The action of sulphur and quicksilver lies in the nature of these elements. Their union is not passive, but active. They *are* not combined, but they *do* combine. He who observes and studies nature cannot be blind to the fact that an inalienable, intrinsic power is resident in every thing that exists. This is true not only of organised life, but also of the chemical elements as well as of gravitating masses. The motion of a falling stone can, no more than the actions of oxydising substances, be considered as ultimately due to an extraneous pressure that makes them move by push, or to a *vis a tergo* acting upon inert matter. These motions must be spontaneous; they are due to powers inherent in the nature of reality. They are self-motions, and in this sense we say that all nature is alive.

The term "life" is here used in a broader sense than ordinarily. It means spontaneity or self-motion, while in its common signification the term "life" is restricted only to the spontaneous action of

* Spontaneous motion (as here defined) does not mean action without a cause; nor does the spontaneity of the cart exclude the co-operation of other spontaneities (*e. g.* the attraction of the earth) entering as factors in bringing about the final result.

organised beings, i. e. of plants and animals. In order to distinguish life in the broader sense from the narrower or common acceptance of the term, we call the latter "organised life."

It is not impossible, and I consider it even as most probable, that the difference between Professor Haeckel and myself rests on a different usage of the term soul. But a vague or inconsistent usage of the term, unless we are especially careful in so defining it as to prevent misunderstandings, will inevitably beget errors. Thus the doctrine of Panpsychism is liable to lead to fantastic ideas, and to cause great confusion concerning the activity of what is generally called inanimate nature.

Soul (as I understand the term) is a system of sentient symbols.

The problem of the origin of the soul is solved as soon as we understand how feelings can acquire meaning.

Suppose we have some sentient substance exposed to the impressions of the surrounding world. The sense-impressions of the surrounding world leave traces in the sentient substance; these traces, which are structures of a certain form corresponding exactly to the various impressions, are preserved and constitute a predisposition to being very easily revived by impressions of the same kind. The revival of feeling in traces left in the sentient structure from former impressions is called memory. If a new impression of the same kind as the traces of the former impressions affects a sentient being, the new impression already finds a convenient path for its reception prepared. Its peculiar vibration fits in the old trace and thus runs along very easily in the memory-grooves of former impressions, reviving at the same time the feelings perceived at their original formation. The feeling thus caused is composed of several elements, which naturally melt into one: first, there is that kind of feeling which is produced by the present impression; secondly, there is the revival of former feelings or memory-sensations; and thirdly, there is a feeling of congruence resulting from the combination of these two. This third element is a new and a very important feature. We suppose that it is extremely insignificant in the beginning, but being a constantly growing factor, it rapidly increases in importance. The stronger and the more independent the memory-structures become, the more

clearly will their congruence with fresh sense-impressions be felt as a congruence.

This feeling of congruence is the simplest form of what psychologists generally call "recognition."

The recognition of a sense-impression, as being the same as some former sense-impression, adds to the feeling a new quality; it imparts meaning to it. This feeling of a special kind will now stand for something. In this way impressions upon sentient substance will, in the course of their natural development, simply by the repetition of similar and same impressions, come to indicate the presence of certain conditions that cause the impression. This act of indicating something, of symbolising the presence of a reality, of possessing meaning, is the birth of soul. Sense-impressions that have acquired meaning are called sensations. A sensation standing for a special object symbolises that object. Abstract ideas are symbols of a higher degree, but they remain symbols just the same. And it is the sentient symbols which constitute the soul.

Those actions which are regulated by the meanings of sentient symbols of which a soul consists should alone, according to a strict terminology, be called "psychical." The falling stone, the chemical elements, when combining or separating, etc., are alive; there is a spontaneously acting power even in unorganised nature; but the actions of unorganised nature are not determined by the meaning of feelings, and, in truth, we have no reason to believe that their feelings—granting that they really do possess feelings of some kind—are freighted with even so much as the slightest inkling of significance. In a word, there is no soul in the stone; there is no mind in the water-fall; and there is nothing psychical in either oxygen or hydrogen. But there is soul wherever meaning can be found as the regulating motive of actions; there is purpose. And wherever purpose is, there is mind.

PLEASURE AND PAIN.

Professor Haeckel goes still farther in the application of his theory of Panpsychism: he speaks of the atoms not only as feeling each other, but also as having pleasure and pain. This indicates

either that he is serious in his belief in the psychical nature of all things, or it proves how dangerous it is to introduce an allegorical expression the allegorical character of which is from the beginning lost sight of.

What are pleasure and pain?

Pleasure and pain are known to us by experience; they are feelings. Pleasure is an agreeable, pain a disagreeable feeling.

Pleasure and pain are different from sensation. Sensations are representative of certain somethings called objects. Pleasures and pains, however, are not representative, they are purely subjective states. There may be pleasurable or painful sensations, and there may be pain indicating the presence of pain-producing objects, but that does not concern us now. When speaking of pleasure and pain we do not refer to the representative value of feelings, but consider a merely subjective aspect, pleasure being the agreeableness, pain the disagreeableness of feeling.

Accordingly pleasure and pain presuppose the existence of an organised system of feelings. An isolated feeling, we have learned, is meaningless; it is still less pleasurable or painful. In order to agree or disagree, there must be something with which to agree or disagree. Therefore, although pleasure and pain are not symbols indicative of some objective presence, they can take place only in sentient organisms, in systems of feelings, in souls. Where these complex conditions, indicative of the presence of a soul, are absent, we have no right to speak of the presence of pleasure and pain.

We cannot interpret the phenomena of unorganised nature as being endowed with feelings of pleasure and pain. Pleasure and pain are psychical phenomena, and psychical phenomena can take place in souls only.

We might as well speak of the presence of positive and negative electricity in the cataract, the water-power of which is employed to produce electricity. Electricity is, in such a case, transformed water-power; but can we, for that reason, say that the motion of water is either positive or negative electricity?

All the motions of the objective world must be supposed to have their subjective correlates; but the simplest forms of objective

phenomena cannot have those subjective correlates which, according to our experience, appear and have their conditions of appearance only in the most complex and highest developed forms of existence—in organised nature.

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The physiological conditions of pleasure and pain are now just beginning to be investigated (see Goldscheider's article in Dubois-Reymond's *Archiv*, 1891), and most philosophical theories concerning the nature of pleasure and pain are mere assumptions. Almost all the views that are now current attempt an explanation by generalising the idea of pleasure and pain so as to regard the feelings of pleasure and pain as a universal feature of nature. This vicious method of generalisation at the cost of discrimination has produced much confusion in the world; and its influence is the more pernicious as average minds are easily satisfied with generalities.

Now, the theory of making pleasure and pain universal features of existence is a palpably erroneous theory; it is a wrong generalisation. It is true that sentient beings naturally seek pleasure and avoid pain. But are we allowed, according to the laws of logic, to transfer the special feature of the case to the whole class of all processes where a seeking and an avoiding can be observed? Certainly not. Because sentient beings are repelled by pain and attracted by pleasure, we cannot say that every repulsion is due to pain and that every attraction is due to pleasure.

The theory according to which pleasure and pain alone are the causes of attraction and repulsion we may fairly consider as a poetical license justifiable within certain narrow limits, and actually justified in so far as there is in every natural process some peculiar feature that is analogous to the feelings of sentient beings. This peculiar feature—viz. its subjectivity—is, as we have seen, not visible, not observable; yet it exists: it is that something which in the course of evolution becomes, in special combinations, first feeling and then consciousness. But for that reason it is not as yet either consciousness or feeling.

While on the one hand the theories of pleasure and pain that regard pleasure and pain as universal features of natural pheno-

mena, are arrived at by a wrong method of generalisation, we find on the other hand they do not agree with facts. They neither explain nor account for the appearance or disappearance of real pleasures and pains such as take place in animal life.

* * *

Starting from merely theoretical considerations, Kant defines pleasure as a feeling of furtherance, pain, as a feeling of hindrance of life; and so prominent a physiologist and psychologist as Alexander Bain says that "States of pleasure are connected with an increase, states of pain, with an abatement of some or of all the vital functions."

A consideration of the actual causes of our pleasures and pains will prove the incorrectness of these views, which are also due to wrong generalisations. An increase of the vital functions and a further growth, either of the organs or of the whole organism, is very often accompanied with pain. A growing tooth causes, as a rule, as much pain as a decaying tooth. And if by some drug the decay is hastened and the nerve is killed, there is, connected with the suppression and sometimes with the mere abatement of the vital function, an abatement of the pain also.

Feelings of pleasure and pain presuppose that habits have been formed in a sentient organism.

Pain is not always a hindrance of life, nor is every hindrance of life painful. Pain is not an abatement of the functions of life, not a decay, nor a destruction. But pain is always a disturbance of life and of the habits that have been formed.

Growth is, under certain circumstances, as much a disturbance as is decay. And decay, if it is simply an abatement or cessation of function, is not accompanied with pain.

While pain is always a disturbance of the functions of an organism, pleasure is simply the gratification of wants; functions and wants being formed by habits, we may briefly say that pleasure is agreement, pain disagreement, with habits.

There are natural wants and unnatural wants. There are habits beneficial to the furtherance of life, and there are habits injurious to the furtherance of life. The pleasure connected with the gratifi-

cation of wants does not depend on its being a furtherance or a hindrance of life, but solely on the intensity of the want. And the intensity of the want, again, depends on the degree to which a habit has become inveterate.*

* * *

The theory of pleasure and pain which regards pleasure as indicative of the growth, and pain, of the decay of life, leads ultimately to the ethics of hedonism, which identifies the good with the pleasurable. However, if our view of pleasure and pain be correct, it is apparent that the pleasure theory in ethics is wrong in its very foundation. The pleasurable would cease to be a criterion of goodness; for many things are pleasurable that are bad, and many things are painful that are good. Growth, development, progress, evolution have often been, nay must mostly be bought with great pain, tribulation, anxiety, and also with the renunciation of pleasures. On the other hand the fulness of pleasure is always a very dangerous symptom for any state of existence.

The seeking of pleasure and the avoiding of pain are certainly very questionable guides in determining what right conduct is. In adopting pleasure and pain as the principles of ethics, we adulterate the nature of morality; for morality exists and has been called into being simply to counteract the dangerous allurances of that which promises to produce pleasure and to avoid pain. Ethics has to teach us how to live, how to develop, how to grow, how to make our lives useful and serviceable. If ethics were simply a method of how to obtain the greatest amount of pleasure, we might better openly confess that there is no moral goodness but only pleasurableness, and consequently that morality is a chimera and ethics a farce.

A defender of the pleasure theory in ethics writes in reply to this criticism of his view: "To seek pleasure and to avoid pain is

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* This theory of pleasure and pain was first set forth in an editorial article of No. 120 of *The Open Court*, which has been republished in the chapter "Pleasure and Pain," pp. 338–345, of *The Soul of Man*. A correct view of the nature of pleasure and pain is of great importance, especially in ethics. Notwithstanding the palpable erroneousness of the old view, several articles written by prominent authors have appeared of late, that continue in the old strain without taking notice of the criticism that overthrows the basis of their theories.

not wrong. Why shall we deprive men of their enjoyments?" Certainly, everyone has a right to enjoy himself; every one has a right to seek pleasure and to avoid pain. But seeking pleasure and avoiding pain is not as yet ethical. Under ordinary circumstances it is right enough to follow the natural impulses of seeking pleasure and avoiding pain. But there are cases where seeking pleasure, be it for ourselves or for others, and avoiding pain, be it for ourselves or for others, become actual wrongs; not because present pleasures will lead to future pains, but because certain pleasures are a hindrance to the higher evolution of the soul.

It is often said that the renunciation of pleasures is richly made up for by the pleasures which are afforded in a more fully developed life. But this, in my opinion, is not true. The adult has rather less pleasures than the child, and the civilised or highly cultured man does not enjoy himself as much, as easily, and as cheaply as does the savage, the uncultured, the fool.

III. MR. THOMAS A. EDISON'S PANPSYCHISM.

Some time ago Mr. Thomas A. Edison was interviewed on the question, "What is life?" Mr. Edison answered the question; and his view is quite in accord with Professor Haeckel's idea of panpsychism. The article appeared first in a daily newspaper. Being remarkable for its coincidence with the views of a great scientist, and coming from the pen of so interesting a man as the famous inventor of the phonograph, we deem it best to republish it in full, with Mr. Edison's permission, who, at the same time, acknowledged the copy we sent him as correct.

This is the article:

INTELLIGENT ATOMS.

BY THOMAS A. EDISON.

My mind is not of a speculative order, it is essentially practical, and when I am making an experiment, I think only of getting something useful, of making electricity perform work.

I don't soar; I keep down pretty close to earth. Of course there are problems in life I can't help thinking about, but I don't try to study them out. It is necessary that they should be studied, and men fitted for that work are doing it. I am not fitted

for it. I leave the theoretical study of electricity to the physicists, confining my work to the practical application of the force. It is my belief, however, that every atom of matter is intelligent, deriving energy from the primordial germ. The intelligence of man is, I take it, the sum of the intelligences of the atoms of which he is composed. Every atom has an intelligent power of selection and is always striving to get into harmonious relation with other atoms. The human body is, I think, maintained in its integrity by the intelligent persistence of its atoms, or rather by an agreement between the atoms so to persist. When the harmonious adjustment is destroyed the man dies, and the atoms seek other relations.

I cannot regard the odor of decay but as the result of the efforts of the atoms to dissociate themselves; they want to get away and make new combinations. Man, therefore, may be regarded in some sort as a microcosm of atoms agreeing to constitute his life as long as order and discipline can be maintained. But, of course, there is dissatisfaction, rebellion and anarchy leading eventually to death, and through death to new forms of life. For life I regard as indestructible.

All matter lives, and everything that lives possesses intelligence. Consider growing corn, for example. An atom of oxygen comes flying along the air. It seeks combination with other atoms and goes to the corn, not by chance, but by intention. It is seized by other atoms that need oxygen, and is packed away in the corn where it can do its work. Now carbon, hydrogen and oxygen enter into the composition of every organic substance in one form of arrangement or another. The formula *CHO*, in fact, is almost universal.

Very well, then, why does a free atom of carbon select any particular one out of 50,000 or more possible positions unless it wants to? I cannot see how we can deny intelligence to this act of volition on the part of the atom. To say that one atom has an affinity for another is simply to use a big word. The atom is conscious if man is conscious, is intelligent if man is intelligent, exercises will-power if man does, is, in its own little way, all that man is. We are told by geologists that in the earliest periods no form of life could exist on the earth.

How do they know that? A crystal is devoid of this vital principle, they say, and yet certain kinds of atoms invariably arrange themselves in a particular way to form a crystal. They did that in geological periods antedating the appearance of any form of life and have been doing it ever since in precisely the same way. Some crystals form in branches like a fern. Why is there not life in the growth of a crystal? Was the vital principle specially created at some particular period of the earth's history, or did it exist and control every atom of matter when the earth was molten? I cannot avoid the conclusion that all matter is composed of intelligent atoms and that life and mind are merely synonyms for the aggregation of atomic intelligence.

Of course there is a source of energy. Nature is a perpetual motion machine, and perpetual motion implies a sustaining and impelling force.

When I was in Berlin I met Du Bois-Reymond, and, wagging the end of my

finger, I said to him, "What is that? What moves that finger?" He said he didn't know; that investigators have for twenty-five years been trying to find out. If anybody could tell him what wagged this finger, the problem of life would be solved.

There are many forms of energy resulting from the combustion of coal under a boiler. Some of these forms we know something about in a practical way, but there may be many others we don't know anything about.

Perhaps electricity will itself be superseded in time, who knows? Now a beefsteak in the human stomach is equivalent to coal under a boiler. By oxidisation it excites energy that does work, but what form of energy is it? It is not steam pressure. It acts through the nerve-cells, performs work that can be measured in foot pounds, and can be transformed into electricity, but the actual nature of this force which produces this work—which makes effectual the mandate of the will—is unknown.

It is not magnetism, it doesn't attract iron. It is not electricity—at least such a form of electricity as we are familiar with. Still, here it is necessary to be guarded, because so many different forms of electricity are known to science that it would be rash to say positively that we shall not class vital energy as a form of electrical energy. We cannot argue anything from difference in speed. Nerve-force may travel as fast as electricity, once it gets started. The apparent slowness may be in the brain. It may take an appreciable time for the brain to set the force going.

I made an experiment with a frog's leg that indicates something of the kind. I took a leg that was susceptible to galvanic current. The vibration produced a note that was as high as a piccoto. While the leg was alive it responded to the electrical current; when it was dead it would not respond. After the frog's leg had been lying in the laboratory three days I couldn't make it squeal. The experiment was conclusive as to this point: The vital force in the nerves of the leg was capable of acting with speed enough to induce the vibration of the diaphragm necessary to produce sound.

Certainly this rate of speed is greater than physiologists appear to allow, and it seems reasonable that there is a close affinity between vital energy and electricity. I do not say they are identical; on the contrary I say they are very like. If one could learn to make vital energy directly without fuel, that is without beefsteak in the stomach, and in such manner that the human system could appropriate it, the elixir of life would no longer be a dream of alchemy. But we have not yet learned to make electricity directly, without the aid of fuel and steam.

I believe this is possible; indeed, I have been experimenting in this direction for some time past. But until we can learn to make electricity, like nature, out of disturbed air, I am afraid the more delicate task of manufacturing vital energy so that it can be bottled and sold at the family grocery store will have to be deferred.

Electricity, by the way, is properly merely a form of energy, and not a fluid. As for the ether which speculative science supposes to exist, I don't know anything about it. Nobody has discovered anything of the kind. In order to make their

theories hold together they have, it seems to me, created the ether But the ether imagined by them is unthinkable to me. I don't say I disagree with them, because I don't pretend to have any theories of that kind, and am not competent to dispute with speculative scientists. All I can say is, my mind is unable to accept the theory. The ether, they say, is as rigid as steel and as soft as butter. I can't catch on to that idea.

I believe that there are only two things in the universe—matter and energy. Matter I can understand to be intelligent, for man himself I regard as so much matter. Energy I know can take various forms, and manifest itself in various ways. I can understand also that it works not only upon, but through, matter. What this matter is, what this energy is, I do not know.

However, it is possible that it is simply matter and energy, and that any desire to know too much about the whole question should be diagnosed as a disease; such a disease as German doctors are said to have discovered among the students of their universities—the disease of asking questions.

THE NATURE OF INTELLIGENCE.

Mr. Thomas A. Edison's article is full of suggestions which invite further discussion. We must here limit ourselves solely to those which touch the problem of Panpsychism and Panbiotism.

Any one who has read Mr. Edison's article will be struck with the strange coincidence that obtains between his and Professor Haeckel's views. The famous naturalist considers what he calls panpsychism as the corner-stone of his monism: he says that atoms possess souls; and in a similar way the famous inventor believes in the intelligence of atoms, he declares that atoms are endowed with minds. There is certainly a deep truth in this conception of nature; and yet we cannot accept it in the way it is presented by either Professor Haeckel or Mr. Edison.

With reference to Professor Haeckel's views we have explained why atoms, the actions of which are not endowed with meaning, have no soul, and also why they cannot feel pleasure and pain. It remains for us to explain why atoms are not in possession of intelligence.

What is intelligence?

That reaction upon a stimulus which takes place in the way it does because of the presence of meaning, is called mental, or in-

telligent action; and the ability to adjust action to mental representations is intelligence.

Intelligence is a psychical quality, and the psychical process which is preparing to act with intelligence is called deliberation. Deliberation is the successive revival of several soul-structures, either of memories of former experiences, or of rules derived therefrom, or of advice formerly received, including also new combinations of these mental structures, and keeping in view the probable results of the intended action. In a word, deliberation is thought, and thought is an interaction among meaning-freighted feelings.

Among these ideas, which in so far as they can influence action (i. e. purposive motions) are called "motives," the strongest one will determine the result. Now, any atom of non-organised matter, say an atom of hydrogen, acts (as we said above) with spontaneity. It is in this sense as much alive as is any ever so complex vegetable or animal substance. It is self-acting, and its action reveals the innermost nature of its being just as much as the action of the man shows the character of the man.

There is, however, a great difference between the action of animal beings whose action is regulated by the meanings of their feelings, which in their totality we call the soul, and the actions of inorganic matter, of crystals, minerals, gases, chemical elements, and gravitating masses, all of which we comprise under the name "inanimate nature." The stone's fall does not depend upon any representative feeling; it depends solely upon that quality of the stone which we popularly call its weight. Nor has the falling stone any choice whether to fall or not to fall. Under certain circumstances it falls. There is no act of deliberation preceding the fall. Nor has it any choice concerning the direction of its fall. The surrounding conditions, viz., its position with regard to the centre of the earth together with its mass, determine the process. The stone's action can satisfactorily be explained without attributing to it psychical qualities. The stone possesses no soul; it is void of mentality; and although we believe that everything, organised or unorganised, is endowed with subjectivity (by which we understand the conditions of psychical life, or the potentiality of feeling and consciousness), this

subjectivity can only be analogous to the blind impulse of the stone's mass. If some other, psychical or mental, subjectivity were present, we should say that it apparently does not enter as a factor in the determination of the event. Accordingly such an assumption is gratuitous. There is subjectivity, but there is no intelligence. There is potentiality of feeling, but there is no consciousness. There is present the elementary condition of that something which is going to develop into mind, but there is no mind; there is no meaning-freighted awareness of the surrounding conditions.

Says Mr. Edison:

"The intelligence of man is, I take it, the sum of the intelligences of the atoms of which he is composed."

The sum total of the intelligences of the atoms in a human body (if, in this connection, for the sake of argument, we grant that atoms are intelligent) would not as yet make up the intelligence of man. Suppose we are contemplating a mosaic picture or inscription. Are such compositions really only the sum of the little stones? Are they not rather a certain peculiar form in which these colored stones are arranged? It is not the sum of the stones that makes the picture, but the form of their composition. The picture is not contained in any single one of them, nor is it the whole number of all the single stones: it originates through their peculiar combination and consists of the form in which they are combined.

Mr. Edison's explanation of the soul, applied to this example of a mosaic picture, would be as follows: Every little stone is in itself a little mosaic picture. The whole picture of the mosaic is the sum of the little pictures of the stones of which it is composed.

The intelligence of the soul, however, is not even as yet the form in which feeling structures combine; it originates with the representative faculty of the feeling structures. The soul is the organised totality of a set of images and abstract mental symbols representing the qualities, the influences, and the interactions of the different objects of the surrounding world, the thinking subject included.

Says Mr. Edison:

"Every atom has an intelligent power of selection, and is always striving to get nto harmonious relation with other atoms."

The latter is true; the former is an error. Every atom "is always striving to get into harmonious relation with other atoms"; this is its nature; and its nature being stable, consisting of certain inalienable and intrinsic qualities, the atom acts with consistency. Certain atoms, say atoms of hydrogen, are of such a nature as to combine with certain other atoms, say atoms of oxygen, into molecules that form a certain substance of peculiar properties, which, if each atom of oxygen combines with two atoms of hydrogen, would be H_2O, or water. This substance again, having certain definite qualities, will in a temperature below freezing point crystallise at a definite angle. The angle of crystallisation being the same for all molecules H_2O, the result will necessarily be one of most marvellous regularity. And not being able to observe the atoms in their secret activity, not knowing all the details of nature's marvellous laboratory, we are astonished to find such a wonderfully harmonious relation. And yet, considering the nature of things, we are urged to confess that it is the result of an inevitable necessity, which takes place according to strict mathematical laws.

Although every atom strives, according to its nature, to get into harmonious relation with other atoms, we do not see any "intelligent power of selection" in the province of inorganic nature. Every atom of inorganic substances acts according to its nature in one and the same way throughout. There is no choice, no selection, allowed. Choice and selection are faculties that are reserved for the higher domains of psychical life, which originates in the domain of animal existence when meaning, conditioned by the presence of sentiency, rises into being and creates the soul.

Supposing that through some combination of atoms their subjectivity be combined in such a form as to produce sentiency or feeling, we can very easily understand how this feeling will in time become representative of the conditions by which it is affected. The soul does not consist of the atoms of its organism, nor of the sum of the qualities of the atoms. The soul consists of something more subtle than matter: the soul consists of the meaning that is attached to the different forms of the feelings which obtain in living organisms.

THE PROBLEM OF THEISM.

The problem as to whether or not there is an element of feeling present in the unorganised realm of nature, is connected also with the problem of theism. The monistic view of the world, which considers nature as alive throughout, can neither accept the old supernaturalism, nor the materialistic theory of atheism. Theism, as it is usually conceived, believes in a personal creator and ruler of the world. Materialism denies the existence of any God; it regards matter and its actions as the only reality.

Monism does not regard mental phenomena as an incidental by-play of blindly operating forces. It regards mind as a necessary product of reality. Mind and the peculiar qualities of mind are characteristic of the world-tree, of which it is the highest efflorescence we know. From the fruit we can know the root, from the product we can judge of the factors, in the creature we see the creator.

That great something which has produced us, the All-power in which we live and move and have our being, and obedience to the laws of which are the conditions of life, of welfare, and of an advance to higher life, is called with a popular religious name "God."

Let us comprise under the name "theism" all those views which recognise *any* conception of God, and reserve the term anthropotheism for that view which regards God as a person, a mind, a conscious being, or a world-ego. Atheism in that case will be a negation of the existence of God in any form, a negation of the All-power of which we are parts and to which we have to conform; and accordingly atheism will be also a negation of any authority of moral conduct.

We call attention to the fact that many who call themselves atheists, simply because they do not believe in anthropotheism, are according to this definition not to be classed among the atheists.

What has monism to say on the problem of the existence of God?

Prof. George J. Romanes, in an article which appeared some time ago in the *Contemporary Review* under the title "The World as

an Eject," declares that monism has left the problem of theism in the same state it was in before. He says:

"The views of the late Professor Clifford concerning the influence of monism on theism, are unsound. I am in full agreement with him in believing that monism is destined to become the generally accepted theory of things, seeing that it is the only theory of things which can receive the sanction of science on the one hand, and of feeling on the other. But I disagree with him in holding that this theory is fraught with implications of an anti-theistic kind. In my opinion, *this theory leaves the question of theism very much where it was before.** That is to say, while not furnishing any independent proof of theism, it likewise fails to furnish any independent disproof.

"As a matter of methodical reasoning it appears to me that monism alone can only lead to agnosticism. That is to say, it leaves a clear field of choice as between theism and atheism."†

Clifford says in the passage referred to by Professor Romanes:

"Reason, intelligence, and volition are properties of a complex which is made up of elements themselves not rational, not intelligent, not conscious."

Rational, intelligent, conscious beings, so far as their material existence is concerned, are made up of elements not rational, not intelligent, not conscious. But mind, reason, intelligence are not at all made up of material elements; they are neither latent nor germinal and least of all fully developed properties of the single atoms. Reason can in our conception never be explained as a complex result of the interaction of absolutely irrational elements. The material elements of the world, it is true, are not intelligent, not conscious; but the world as a whole (although *not* conscious and *not* endowed with purposive volition) is at least *not ir*rational and not void of determination. On the contrary the world as a whole is the prototype of all rationality, and human reason is a mere image of the world-order. What is the reason of a rational being but an incarnation of this world-order?

Reason is not a thing of matter; exactly so the world-order is not a thing of matter. But it exists none the less; it is a reality.

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* *Italics are ours.*

† This same position is maintained with equal vigor in Professor Romanes's latest work *Darwin and After Darwin*, pp. 412–442. The Open Court Publishing Co., 1892.

On the other hand, the world-order need neither be a personal being nor the work of a personal being. The order that prevails in the real world and in the laws of nature appears also in the ideal world, in the laws of formal thought, in mathematics, and its kindred sciences; and the same rationality that obtains in the ideal domain permeates the realms of reality, the universe of objective existence.

The idea that God created the world-order and dictated its laws is a fanciful and poetical allegory; it is as such a pagan notion which belongs in the same category with Hesiod's Cosmology, but it is scientifically and philosophically unthinkable. For God is eternal and God's being is eternal. God has not created his own attributes and the world-order is simply an attribute of God; it is part and parcel of his nature. Or can you think of God without that attribute of irrefragable order that appears to science as necessity, to religion as holiness, to ethics as justice, to art as the law of beauty, to the mystic as the key to all the wonders of existence which though solving all the problems remains most wonderful itself?

The world as a whole, the cosmos, God, or whatever we call the One and All, is the prototype of all reason, but he is not a mind; he is not a system of sentient symbols; he is not a soul. Minds are a special kind of God's creatures; but God is not a creature: he is the condition of the existence of creatures, he is the creator.

The objection is made from materialistic quarters: "What is the world as a whole but the sum of all atoms!" This is an error. The world is not merely the sum of all its atoms; the universe does not consist of innumerable little particles which in their combination form the All. On the contrary: the world as a whole, existence in its oneness, or speaking religiously God, is alone the only true reality; all other things and beings are parts of him. Atoms are abstract concepts; the existence of an atom and of its actions presupposes the existence of the great whole of which it is a part, and without which it would have no reality. There are no atoms in themselves. Atoms regarded as things in themselves are a scientific superstition.

Professor Romanes advances the proposition, that cosmical events, being as highly complex as nervous phenomena, might be possessed of a similar subjectivity. The nervous phenomena which

constitute the physiological action of mind in the province of objectivity are, it is true, very complex, but complexity does not constitute that characteristic feature on the presence of which depends the origin of mind.

Professor Romanes says:

"Both mind and matter in motion admit of degrees: first as to quantity, next as to velocity, and lastly as to *complexity*. But the degrees of matter in motion are found, in point of observable fact, not to correspond with those of mind, save in the last particular of complexity, where there is unquestionably an evident correspondence.

"Now, if we fix our attention merely on this subject-matter of complexity, and refuse to be led astray by obviously false analogies of a more special kind, I think that there can be no question that the macrocosm does furnish amply sufficient opportunity, as it were, for the presence of subjectivity, even if it be assumed that subjectivity can only be yielded by an order of complexity analogous to that of a nervous system. For, considering the natural and dynamical system of the universe as a whole, it is obvious that the complexity presented is greater than any of its parts. Not only is it true that all these parts are included in the whole, and that even the visible sidereal system alone presents movements of enormous intricacy, but we find, for instance, that even within the limits of this small planet there is presented to actual observation a peculiar form of circumscribed complex, fully comparable to that of the individual brain, and yet external to each individual brain. For the so-called 'social organism,' although composed of innumerable individual personalities, is, with regard to each of its constituent units, a part of the objective world—just as the human brain would be, were each of its constituent cells of a construction sufficiently complex to yield a separate personality."

The so-called social organism which is composed of innumerable personalities undoubtedly yields a peculiar spiritual existence, which cannot be explained solely as the sum of the parts and actions of its constituent individuals. The relations in which the members of society stand to each other are of an analogous importance to the relations of the cells and organs in an organism. It is the form that constitutes this or that kind of an organism, not the sum of atoms, nor the intricacy or complexity of their combinations. Different forms of perhaps the same material amount, and of the same intricacy of combination, yield quite distinct types of individuality, and every state, every nation, every society possesses, as it were a personality of its own.

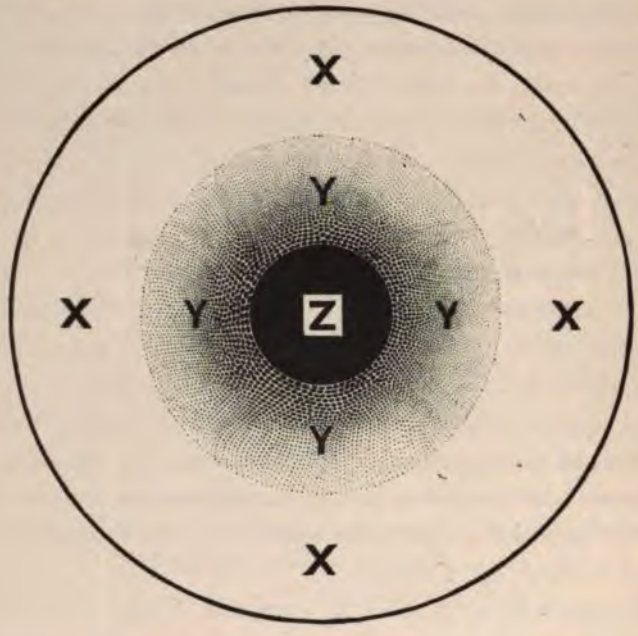
Mind is not constituted by complexity. Mind is a system of sentient symbols. Wherever we find organisms acting in such a way that their actions depend upon the *meanings* of certain stimuli, we have to attribute to them that characteristic feature which we call mind, or soul. The action of a falling stone is explainable without attributing to it any mentality. There is no representative value, no meaning in that quality of the stone which, under certain conditions, makes the stone fall. However, if a man acts, the motive of his action does not consist in the gravity of certain material particles of his brain. It consists in the meaning that resides in certain feelings. Without taking into consideration the meaning that dominates the man's motives, we cannot explain his action, and it is the meaning of feelings that the soul consists of. Only where and when we can discern the presence of meaning as the raison d' être of actions, are we justified in calling phenomena mental. When the action that takes place in response to a stimulus depends solely upon the significance of a symbol, the inference is legitimate, nay, it is inevitable and conclusive, that we have to deal with a mind. The motion of a comet, which depends perhaps not only upon the gravity of its mass, but also upon the chemical actions and explosions of its constituent elements during its approach to the sun, may be ever so intricate; but this does not in the least justify the assumption of the presence of mind in the comet.

The assumption of mind in inorganic nature is not only fantastical, it is also needless. Facts are better explained without this speculation.

The world as a whole is not bare of subjectivity. In this we agree with both Clifford and Romanes. But we do not identify subjectivity and mind, the latter being a special and indeed a very complex form of subjectivity. We suppose that subjectivity pervades also all the processes of unorganised nature, and no less the cosmic events; but be they ever so much more complex than nervous phenomena, there is present only a non-mental subjectivity.

Yet although the phenomena of so-called inanimate nature, be they motions of celestial bodies or physical and chemical processes, are non-mental, there is in every one of them present that grand

feature which is as it were the breath of God. This feature appears in all the phenomena of nature, but in none of them more gloriously than in the soul of man. Even the cosmical events of marvellous sublimity appear as a mere prelude to the appearance of soul-life, for in soul-life is focused all the divinity of nature. Reason is the reflex of the world-order and thus a rational being is made in the likeness of God.



Professor Romanes presents the problem of the subjectivity of existence by the adjoined diagram, which he explains as follows:

"Following Clifford, I will call these inferred subjectivities by the name of 'ejects,' and assign to them the symbol *Y*. Thus in the following discussion *X* = the objective world, *Y*, the ejective world, and *Z*, the subjective world. Now, the theory of monism supposes that *X*, *Y* and *Z* are all alike in kind, but presents no definite teaching as to how far they may differ in degree. We may, however, at once allow that between the psychological value of *Z* and that of *X*, there is a wide difference of degree, and also that while the value of *Z* is a fixed quantity, that of *Y* varies greatly in the different parts of the area *Y*."

The deep shading of *Z* indicates consciousness, and consciousness is that form of subjectivity which constitutes our mind. *Z* is

not, as Professor Romanes asserts that it is, a fixed quantity; it varies greatly, as every one knows from his own experience. It is lowest in trance or swoon or profound sleep. It is highest in the state of concentrated attention. The ejective element, which we assume to be present as a correlative concomitant in the objective world, we assume, with Professor Romanes, varies greatly in the different parts of the area *Y*. Like Professor Romanes, we also do *not* assume the existence of any unshaded *X*. There is no objectivity without its subjective correlate. But, according to the theory of monism, the nature of the concomitant subjectivity is not unknowable: it can be inferred from the nature of objective existence. The subjectivity of the falling stone is most elementary, and *not mental*; its action is not prompted by meaning. That something which impels the stone to fall, and which science calls gravity, does not possess any representative element. There is no symbolism involved in gravity. There is no soul in the stone. The stone is not incited to falling by any purpose; it has no end in view. Purpose originates with and through the presence of representative symbols. According to the theory of monism the shading of the surrounding zones is not a matter concerning which we have to suspend our judgment. If monism is true, we know very well how deeply we have to shade the different phenomena of objective nature.

Taking this view, we object to Professor Romanes's conclusion when he says:

> "Without in any way straining the theory of monism, we may provisionally shade *X* more deeply than *Z*, and this in some immeasurable degree.
>
> "Monism sanctions the shading of *X* as deeply as we choose; but the shading which it sanctions is only provisional."

While the presence of mind in the phenomena of the stellar universe and of inorganic nature must decidedly be denied, I would not, for that reason, declare that monism is atheistic.

Monism is decidedly theistic although not anthropotheistic. It is monotheistic in so far as it recognises that the all-existence in which we live and move and have our being is the *ἘN KAI ΠAN*, the One and All. But there is not the slightest reason for the theory,

and there are sufficient reasons against it, that the universe is possessed of a huge world-ego, that it is a person or a mind.

We maintain on the one hand that the laws of nature are not designs arranged with consciously preconceived purposes. Yet on the other hand, we do not forget, that the world-order possesses quite definite features and that the course of evolution runs in a very unmistakable direction. We can plainly decipher its character, and the great religious teachers of mankind have with a truly prophetic instinct proclaimed the ethical injunctions to be derived therefrom—injunctions which, millenniums after them, science has discovered to be founded in the nature of things.

God is no mind, yet God is mentality, the source of all mind: God is not a spirit, but he is spirituality. The subjectivity of the universe from which all consciousness rises is part of his being, and whatever that subjectivity, considered as a whole, be or be not, that much is certain, that in grandeur it corresponds to the objectivity of the world. It does not think in symbols as a man does; it is not a mind: but it exists nevertheless. Whatever it is like we learn from the revelation of its appearance in objective existence, from the cosmic order, the laws of nature, and the moral ideas of mankind.

Knowledge of nature means knowledge of God, for nature is God as he appears and the objectivity of being is the revelation of God.

We would not limit God to the subjectivity of nature: God is both subjectivity and objectivity combined. He is that All-power that is, was, and will be, thus being the ultimate authority of conduct.

God is not a mind, he is more than a mind; God is not a system of symbols, he is the reality symbolised in mind. He is not a person, he is super-personal.

He who does not see that the God of monism is greater than the God of anthropotheism, had better believe in a personal God, until he appreciates the truth that God is not personal but super-personal. For after all anthropotheism is nearer the truth than atheism, for atheism (well understood, the atheism of our definition above) is a moral nihilism devised to shake off all ethical obligation

so as to make the lust of the moment and the pleasure of the individual the supreme rule of action.

Monism, accordingly, does not leave the problem of theism where it was before. Monism proves that God is not to be conceived in the likeness of man, but the reverse: man, being a system of symbols representing the world, is to be conceived as having been made or rather as having originated in the likeness of God. God is the original, man is the copy. God is the whole, man is the part, in which the whole finds a more or less correct representation. The picture is not perfect, but the grandest duty a man has is the constant approach to a greater perfection. Man is the temporal, God is the eternal. Man is limited, God is the infinite.

EDITOR.

LITERARY CORRESPONDENCE.

I.

FRANCE.

DR. PAUL SOLLIER has just published, in the Bibliothéque Charcot-Debove,* a new and excellent work, *Les troubles de la memoire*. This work is not identical in its purpose with that of M. Ribot; it corrects the latter in certain points, completes and corroborates it in others. M. Sollier set out to discuss this question solely from a medical standpoint, which was intentionally passed over by M. Ribot, but he has also necessarily touched upon its psychological aspects, and, as he informs us himself, he was obliged on the whole to make a medico-psychological study of the question.

The subject is a vast one; one could include in it aphasia and all the weaknesses resulting from the destruction of the brain-centres, whether those of motion or of sensation. M. Sollier has taken the pains to reduce it, however, to definite limits. He studies especially the subject of acquired amnesia (diminutive changes and disaggregations of the memory). He does not consider the subject of congenital amnesia, which is an absence and not a loss of memory. Strictly considered, the only cases of true amnesia, or *organic* amnesia, are those which result from the destruction of the nerve-centres, since in this case there is an absolute loss of the power of forming mental images, and not simply an enfeebling or forgetting of them, which is characteristic of *functional* amnesia. From a clinical standpoint amnesia exists only in the last case. Though the effect may be the same in both cases, the causes are not identical.

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* Rueff, publisher.

Clinical investigation cannot, however, overlook the diminutive changes which take place in the memory and which, as early as 1817, were called by Louyer-Villermay dysmnesia, and which are always closely allied to organic modifications of the brain. As regards amnesia itself, it is important to distinguish simple amnesia from retrogressive and progressive amnesia. M. Sollier explains the motive causes of these different conditions with great lucidity, and renders them easy of comprehension by means of ingenious illustrations.

I call attention to the information he gives us as to the conditions under which a revival of mental images takes place, p. 30; to his criticism of Ribot's opinion, according to which the power of correctly locating events in the scale of time is the true characteristic of psychical memory: it is quite enough if it reproduces events as in the past, that is to say if there exists a conscious knowledge which shows that the mental conception belongs to the past, or is, simply, a remembrance, p. 35 and 40; to his remarks on the strengthening of mental images due to the repetition of remembrances, the necessary sequence of which is that a weakening of old memories follows the destruction of accumulated mental images, p. 48; to his explanation of the processes of retrogressive amnesia (coming suddenly after an attack of vertigo, a blow, etc.) which he bases upon a supposition of a group of mental conceptions in touch with one another, in such a way that the loss of one leading conception in a group deprives this group of sufficient consistency to form a conscious synthesis, p. 70.

As regards the classifications of amnesia M. Sollier censures that of M. Ribot as being neither openly psychological nor openly clinical, and of taking successively as bases the extent of an observed phenomenon, its evolution, its location in time. Moreover, from a clinical standpoint it has led to a joining together of totally incongruous disorders. M. Sollier therefore rejects it, and contents himself with adopting first of all, with M. Falret, the natural classification of general amnesia and of partial amnesia. Moreover, in taking account of the systematising of lost remembrances, he proposes to make a distinction as to the two varieties of systematised (functional) and of non-systematised (organic) amnesia, considered from the

purely psychological standpoint, p. 59. We should thus have, firstly, the classification of general amnesia, including (A) true organic amnesia (destruction of the centre of mental images), and, under the classification of the systematised, (B) functional, or apparent, amnesia (imperfect performance of the functions of the centres): this latter subdividing into two groups, (*a*) amnesia with its varieties (*a'*) simple, (*b'*) retrogressive, (*c'*) progressive, and (*b*) paramnesia : (*a'*) that of locality, (*b'*) that of exactness ; to which it is proper to add (*c*) dysmnesia, which is organic-functional. Secondly, the classification of partial amnesia whether systematised or not, which may be either organic or functional. M. Sollier abandons, moreover, every pathological or etiological classification as being exceedingly unsatisfactory. In the presence of a patient, he justly remarks, the physician can only employ semiology.—I will not enter here into the details of the inquisitor-like investigation entered upon by the author. I must even proceed without stopping through the observations intended for medical men, which form the second part of the work, but I judge that every reader will also find therein many facts which may prove of interest. After having read it, one is more impressed than ever with the importance and delicacy of the motive forces of the memory, in noting the frequency and the varieties even of its sources of weakness. M. Sollier has the credit of pointing them out—in the shape of "defects in synthetical power" and in "will power"—in the sources of weakness where one had not been accustomed to look for them. It would be interesting, he thinks, to find out what part amnesia may perhaps take in the pathogeny of certain nervous disorders, and the influence which it has on their evolution. Specialists for the insane might find therein a new subject of study, and psychology will profit, on the other hand, by that which clinical experience offers it. Is not its main object to learn to understand life as a unit at the same time that it analyses it as a diversity?

* * *

When one passes from a book like that of M. Sollier to the work of M. l'Abbé MAURICE DE BAETS, *Les bases de la morale et du droit*,*

* This book and the following ones are published by F. Alcan.

one is impressed by the change of method. It has become impossible for us to consider pathology as unallied to questions of morality; and we have accomplished this great object of studying matters pertaining to the moral world, the evolution of law, without seeking our base of support in a religious faith or in a metaphysical affirmation. Even M. l'Abbé de Baets himself declares emphatically that he desires to adopt only one starting point from among those we are acquainted with,—the verification of facts,—and truly he shows a good will and knowledge; nevertheless the ground which he considers so firm has, as we believe, no stability. All seems strange to us, if I may so speak, in books of this description. The tone which is peculiar to them, the nature of the facts cited, the progress of the reasoning, impeach them just as surely as the blue color of his costume reveals afar off an inhabitant of the Celestial Empire. I am not an impassioned adversary of the clergy; far from it. I appreciate their intentions and esteem their persons as one should, but I am unable to share their opinions, and I consider indeed that they deceive themselves when they think that faith has ever given to the world an absolute assurance. It has not given it because it has not proved sufficient. Mankind, variable and vacillating though it may be, does not change its beliefs because of fickleness of heart: its mental evolution takes place too slowly for that, and is also too painful. The Catholic church of to-day has adopted as its watchword the return to St. Thomas of Aquinas; it will gain by this unity of effort, without succeeding however in leading back the minds of men to its point of view. The diverse ways we follow tend doubtless as a matter of fact toward the same objective point, and run more or less in the same direction; but humanity scarcely ever passes back again over the paths which it has once traversed.

* * *

We have another little volume by M. Lombroso, *Les applications de l'anthropologie criminelle;* a sequel to *Nouvelles recherches,* which I have mentioned before. We find here interesting pages in regard to transportation and reform schools, and a criticism of the new theories of the penal code (Garofalo, Tarde, Sighele, Onanoff and Blorg, Ferri)—a part of the question considered in the Congress.

A chapter indeed is devoted to the subject of criminal anthropology in modern literature, in regard to which it seems to me M. Lombroso always makes more of a question than is desirable, but which he well understands how to criticise. Then follow several pages on the criminal type in art, after a work of Dr. Edward Lefort; then comes a description of anthropological instruments and methods. I will not affirm that this last work brings us much of novelty; it is chiefly a new and energetic presentation of his views, and M. Lombroso has no doubt whatever that by dint of striking the nail upon the head he will succeed in driving it into the wall of his adversaries.

* * *

The work of M. B. BOURDON, *L'expression des emotions et des tendances dans le langage,* is certainly one of the most curious books one can read. He treats in an original manner of phonetical questions, which are less rife in France than in England and Germany, as to what sounds signify, or speech; what is their worth in intensity, elevation, form or quality, duration; what phenomena are shown by successions of intensity, of elevation, of elementary articulation, of syllables, of words, etc., of duration; what are the relations of these phenomena to versification and what comparison one can make between writing and speech: such are the problems particularly studied, at times with the aid of very simple but instructive facts culled from experience.

These studies—I need scarcely add that they are comparative ones—are of interest for various reasons. They lead up to new ideas of grammar and of language, and furnish arguments for a reform in orthography of which M. Bourdon is a very warm partisan. His readers will not be slow to notice for the matter of that, that he is in regard to this frankly revolutionary; and it may seem paradoxical to say to them, for example, that "the distinction between analytical and synthetical languages is absolutely artificial, and could only be produced through our bad systems of writing." Writing, M. Bourdon indeed remarks, introduces separations in places where spoken language makes no pause. The English write *I will go,* they pronounce it *Iwillgo.* The analysis which pertains to writing masks the true cohesion of the spoken language, and "if in the past all

series of articulations had been written as a single word which were in fact pronounced as a single word, we should not have known the error which consists in opposing certain languages classed as synthetical to others which we class as analytical." The argument is perhaps not a decisive one, and in the neo-Latin languages, for example, one can scarcely deny that the analysis of the written language has conformed to the work of decomposition of the antique forms, so as to adapt itself to the new groupings of their essential elements, groupings wherein these elements remain variable because speech separates them effectively, in many cases by interpolating governing words or others.

But it is not my intention to enter into these detailed discussions. I leave M. Bourdon in further calling attention to his last chapter, *Ecriture*. Persons curious as to graphology will find in it some good ideas concerning this method of "character reading." The author does not tell everything, and I have a suspicion that he greatly despises certain signs valued by the graphologists, and arrived at empirically, but we should note what he has actually said.

* * *

Under the title, *Le monde physique, Essai de conception expérimentale*, M. Dr. JULIEN PIOGER offers to the public a sketch of a world-system. This system is summed up in the expression of "Universal Solidarity," and is based on the idea of infinitely minute matter-particles, or "infinitesimals," the mutual relations of which, and their equilibrium, constitute the machinery of the universe. The atomic-mechanical hypothesis, says M. Pioger, is wrong in resolving matter into perfected differential particles and in assigning to its atoms qualities which make of them either true material corpuscules or a real entity, "a thing in itself." On the contrary, far from intending to assign a limit to materiality, the hypothesis of infinitesimals confines itself to limiting the conception which we may have of it. The infinitesimal corresponds to the infinitely small, that is to say to the non-perfected, to the non-differentiable, beyond our cognisance and our perceptivity; it expresses the most reduced condition of the affinities which constitute matter; it is the expression of the infinitesimal existence of that which we call motion, ex-

tension, ponderability, under the general name of matter. Now the most simple thing which can be conceived of in the physical world, is the *couple* formed by the essential equipoise of two infinitesimals. In developing the couple it becomes possible to form the universe in all its great variety. The solidarity of the parts in the whole appears as the essential condition of existence of all that which Is—the necessary condition of all individuality.

In conclusion I call attention to two new editions, one the well-known work of M. BERNARD PÉREZ, *Les trois premières années de l'enfant*, fifth edition, revised and supplied with an introduction by Mr. James Sully; the other *Les functions du cerveau*, by M. JULES SOURY, a work highly esteemed, embodying the most recent researches.

LUCIEN ARRÉAT.

II.

GERMANY.

One of our foremost psychiatrists, Professor v. Krafft-Ebing of Vienna, says in his celebrated text-book on psychiatry: "If Pedagogy made a more serious study of the character of man in his psychopathological relations, many of the mistakes and severities of our system of education would be removed, many an unsuitable choice of vocation would be left unmade, and thus many a psychical existence rescued."

Any one who is at all familiar with the most important doctrines of the diseased phenomena of mental life, and who knows how frequently psychical disturbances of a more or less serious nature occur during childhood, will fully agree with Krafft-Ebing, and will only regret that pedagogy, in this important direction, has completely neglected its task.

Although lately the necessity of psychiatric knowledge for the pedagogue has been insisted upon in professional circles, for instance, by Professor STRUEMPELL in his *Pedagogic Pathology* (comp. *The Monist* II, 106), yet instruction in this department occupies a wholly subsidiary place in pedagogic education, and has not been made as it should have been, an organic part of the same. The writer of

these lines has accordingly discussed this subject in a special treatise, maintaining that the most important diseased phenomena of mental life might be treated as a part of pedagogic psychology (comp. *The Monist* I, 619).

The demands made were met in different ways. While the English and American press accepted these demands without reserve (for instance, in HALL'S *Pedagogical Seminary*, I, 297), in Germany there has been more caution displayed, inasmuch as the opposing difficulties were regarded as greater than they probably were (Professor REIN'S *Pädagogische Studien*, 1892, Heft I).

We have, however, simply to call to mind the doctrine which more than twenty years ago Maudsley in his "Physiology and Pathology of the Mind" laid such special emphasis upon, that psychic laws are the same in healthy and diseased phenomena, only that they do not operate under the same conditions and therefore produce different symptoms. Far from its being true, therefore, that the introduction of psychopathology into psychology can be opposed by any especially well-founded objections, such a procedure will, on the contrary, be found to be, just as Maudsley said, an appropriate and absolutely indispensable auxiliary of the study of this science. And that which was emphasised by Maudsley, and lately also by MUENSTERBERG in the treatise already discussed in *The Monist* (II, 289), *On the Problems and Methods of Psychology* (Leipsic, 1891, Abel), Ziehen has done in his "Outlines of Physiological Psychology" in a manner which will be full of suggestions for the pedagogue (comp. *The Monist* I, 598).

To be sure, the work of Ziehen is very far from supplying all that the pedagogue needs. We have in this work a vast mass of valuable observations, which will have to be elaborated in a manner that accords with the needs of pedagogy, if this science is to derive any material profit from psychiatry. For the bibliography of this subject we shall refer the reader to a former correspondence of ours (*The Monist* II, 103), and select at present for examination one province only,—a province which is deserving of especial consideration, inasmuch as the phenomena which occur in it are phenomena which most frequently confront the pedagogist, and are most likely to be

overlooked by the untrained eye. We refer to the *psychopathic subsidiary phenomena* of Dr. Koch, by which expression this author comprises all the psychical irregularities, be they natural or acquired, affecting the life of the human personality, which, though not even in the severest cases amounting to actual mental disorders, yet in the most favorable instances so affect the persons afflicted that they appear as lacking the full possession of mental normality and capacity. The second part of Koch's work, mentioned in *The Monist* in the place above cited, has just now appeared. (Ratisbon, 1892, Otto Maier). Having discussed in the first part of his work inherited and chronic psychopathic subsidiary phenomena, the author now proceeds to discuss acquired subsidiary factors, and holds out the prospect of a third part, on the appearance of which we shall have occasion again to discuss the entire work from a different point of view. For the present, only the pedagogic aspect of the question interests us. On many readers, Koch's book must have made the impression,—to judge from his concluding remarks,—that the author shares Lombroso's point of view, and to very many pedagogues such a position would be, from the very outset, a bad recommendation, for it would necessarily, in the very nature of the case, involve the pedagogue in great embarrassment, in the same way as it has involved the philosophical jurist. But embarrassment is no reason why we should close our ears to the truth, and if Lombroso should be right in all his teachings, pedagogy would also be obliged to accommodate its doctrines to his. Upon the whole, however, Koch is opposed to him. Thus when he says: "What I commend Lombroso for is that he has observed much, has collected rich materials, and has been the source of great incentives in many directions, and has worked suggestively in many ways; what I reproach him with is that he has confounded the healthy with the diseased, and has brought under one and the same category without sufficient and appropriate tests, psychotic phenomena and phenomena which are psychopathically merely of a subsidiary order; what I reject is his theory of degeneration and his peculiar views of philosophy."

Material, such as Koch and others offer, must first be elaborated into a pedagogic psychopathology—or better still into a peda-

gogic pathopsychology—before pedagogy, as a whole, can assume in this direction the proper form. Though we consider, now, this preparatory work as indispensable, we can, nevertheless, not think of denying the value of works which, without any profession of far-reaching psychological analysis, put in effective and available form for pedagogy the diseased phenomena of the mental life of children. The first German work of this kind, so far as we know, is from the pen of a Leipsic teacher, GUSTAV SIEGERT, and bears the title *Problematische Kindesnaturen.** This little work is now followed by a more comprehensive treatise, published by a Bremen alienist, Dr. SCHOLZ, already known to the readers of *The Monist* (II, 104), and bearing the title *Die Characterfehler des Kindes, eine Erziehungslehre für Schule und Haus.*† Such books are valuable not only for the observations they offer and the isolated explanations and pedagogic advice they present, but also for the suggestions which the attentive and psychologically cultivated reader can always receive from them.

Like Siegert, Scholz principally shows us isolated child-types wherein diseased qualities play a more or less pronounced rôle. But while the former's presentation is somewhat journalistic in style, that of the latter is more didactic ; although this tendency is not an absolutely rigid one, as the author counts mothers as readers of his book. But if the form of presentation leads one to infer greater profundity in Scholz than in Siegert, this is in still higher degree the case with the arrangement of the material. While Siegert strings his child-pictures loosely together, Scholz arranges them according to real psychological points of view, so that (remarkable to say) the faults of children are discussed, first, in the province of feeling and sentiment, then in that of representation, and finally in that of volition and action. The introductory and concluding chapters show, also, that Scholz attempts to enter more profoundly into the subject than Siegert proposes, and we cherish the hope that, now that this popular work has appeared, Scholz will very soon present us with a strictly scientific book, in which he shall have occasion to deal with some

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* *Problematic Child-natures.* Leipsic, 1890, Robert Vogtländer.

† *Faults of Character in Children, A System of Instruction for School and Home.* Leipsic. Eduard Heinrich Mayer.

particular points, such as, for instance, falsehood and unchastity, more comprehensively than was perhaps possible in a book intended for his present circle of readers.

With respect, now, to all systematic presentations of pedagogy, psychopathology can, as we have before indicated, never attain in them its proper position, until the above-mentioned preparatory work has been completed. But this fact should not preclude one's calling especial attention to the importance of this province, at least in some incidental manner.

In such a work as the *Allgemeine Pädagogik* of ZILLER, for instance, the third edition of which has just been published by F. Mattes of Leipsic, there surely was abundant opportunity to do this—an opportunity which one might say almost amounted to obligation. For Ziller treats hereditary and acquired characteristics in great detail, and such treatment remains necessarily a one-sided one, if abnormal traits are not considered in it. Ziller, with Herbart, demands that individuality always be taken as the starting-point. But how many child-individualities are there, which, in the different periods of their development, may be regarded as fully normal!

The reason of this omission must be looked for partly in the circumstance, that Ziller, as well as the new editor of this otherwise valuable work, belongs to the Herbartian school. If, namely, we compare the psychological literature of the Herbartian school with the publications of French, English, and American writers, or even with the works which in recent times have issued from other philosophical quarters of Germany, it will be unmistakably seen that the pathological conditions of the mind have been little considered by the followers of Herbart. Nor have voices been wanting, that would make Herbart himself responsible for this error. He did not, they say, sufficiently appreciate the importance of the pathological phenomena of mind, and his pupils were in this respect influenced by him. But this reproach will be found, on close examination, to be untenable. Herbart, it is true, did express himself repeatedly against the over-estimation of "rare and curious phenomena," un-

* Compare also, *The Educational Review* (New York), Vol. II, page 30.

usual mental states and such things,* and his warning is applicable also to our epoch, which produces many psychological works in which remarkable things are to be read but which contribute nothing worth mentioning towards the explanation of even comparatively simple events. Herbart holds, that the psychology of the normal and ordinary states should be the first and principal object of scientific attention; the explanation of much that is extraordinary will then follow. With regard to this latter point, he remarks very positively: "I do not, however, wish by this, to gainsay the value of any real psychological observation. There must be a welcome place in science for every experience." It will be seen, therefore, that Herbart is not at all far from the point of view of Maudsley and other investigators. We find, in fact, that he mentions repeatedly abnormal mental conditions, and also systematically treats them, even quoting such celebrated alienists as Reil and Pinel (*Text-book of Psychology*, §§ 142–149). The probability is, therefore, that psychopathology would have been properly employed in Herbart's psychology, if it had been at all elaborated in his day, and its influence would through Herbart have been directly felt in pedagogy, as no pedagogist has made better or more careful use of psychology than he.

But Herbart's pupils have done no further work in the province pointed out by him. It is true, his psychology has been made use of by physicians like Griesinger and Spielmann, and recently also to some extent by Krafft-Ebing, but the works of these men have had no influence on the psychological text-books of the Herbartian school, and consequently the science has up to the present day exerted no noticeable influence on pedagogy, either in Waitz, in Stoy, or in Ziller. In other pedagogic schools, this has, it is true, also been the case; but in these, who make no pretensions of relying on the teachings of psychology, the sin is more easily pardoned. But this is not the only respect in which Ziller's *Pedagogy* is not up to the times. Ziller defined pedagogy as the influences, formed according to ethical points of view, which are brought to bear on the mind of the pupil, and would not admit influences brought to bear

* *Psychologie als Wissenschaft*, § 5.

on the body, in so far as such should enter into the pedagogic system. This misconception also springs from Ziller's adherence to the Herbartian school, which represents, as we well know, a metaphysical pluralism; but it is in a still higher degree due to the fact, that in Ziller's day both the intimate relation between physiological and psychological processes had not been satisfactorily established, and also were not sufficiently known to him. If it were otherwise, his pluralism need by no means have necessarily led him into such one-sidedness, for this metaphysical pluralism does not exclude a monistic conception of *phenomena*; even assuming this doctrine, one may say that motion and feeling are two different but inseparable sides of the same phenomenon. The "real things" produce by their interaction, simultaneously and of necessity, both an inner side and an outer; for which reason one of our foremost psychologists, Volkmann of Volkmar, explicitly terms Herbart's psychology monistic (*Text-book of Psychology*, second edition, I, 63).

A psychologico-physiological work, from which the new editor of Ziller's *Pedagogy* might have extracted many valuable things, is the book of the Italian Mosso, *On Fatigue*, which has just been translated into German,* and which will excite much attention owing to the present active discussion of the question of overwork.

Supplementary to this work I will also mention a little tract by Dr. Burgerstein of Vienna, entitled *Die Arbeitskurve einer Schulstunde*.† This tract is a lecture, which the author gave at the Seventh International Congress for Hygiene and Demography at London, and in which he seeks to find by statistical methods, the duration of a "school-period"—a very laboriously composed treatise and one difficult to read, but possessed of high interest in psychological and pedagogic respects.

From pedagogy to evolution is but a step, at least it is in Ziller's development of Herbart's ideas. It is true, Ziller has taken a decided stand against Darwinism, for Ziller works with two contradictory ideas; but his theory of education possesses points of re-

* Salomon Hirzel, Leipsic.
† Hamburg, 1891, Leopold Voss.

semblance and analogy to the Darwin-Haeckel theory of development. According to Ziller, each individual passes, also intellectually, through all the stages of development that mankind at large has passed through, only in a shorter time; and it is in conformity with such succession that the order of the various courses of a pedagogical system is to be arranged. Following Ziller's precedent, PROFESSOR VAIHINGER, of Halle, in his treatise *Naturforschung und Schule* (Science and the Schools), has taken up the school-reform initiated by Professor Preyer, and has expressly transferred the fundamental law of biogenesis to pedagogy. How instruction is to be arranged under this point of view, cannot be explained in this letter, which is already long enough. We shall simply remark that the idea has found in Germany a large number of both friends and opponents.

The opponents have recently been joined by a natural scientist, DR. HAMANN, professor of zoology in Göttingen, who has just published a book under the title *Entwicklungslehre und Darwinismus* (Evolution and Darwinism),* in which he does not combat the theory of evolution itself, but simply the Darwin-Haeckelian form of that theory, placing himself in the ranks of His and Hensen. The book appeared almost simultaneously with the fourth edition of HAECKEL'S *Anthropogeny*,† but the author, nevertheless, in his supplementary remarks, discusses the "apology" which Haeckel subjoined to his work. Haeckel's book needs no recommendation in scientific circles; it will be sufficient to state that the work has been subjected to essential alterations, but that its fundamental features have remained the same.

A new psychology, on the Darwinian basis, by Prof. FRITZ SCHULTZE of Dresden, is now in course of publication, entitled *Vergleichende Seelenkunde* (Comparative Psychology ‡). The first part, which treats of the fundamental principles of physiological psychology, has already appeared. On the completion of the work we shall have occasion to return to it.

CHR. UFER.

* Jena, 1892, Hermann Costenoble.
† Leipsic, 1892, Engelmann.
‡ Leipsic, 1892.

CRITICISMS AND DISCUSSIONS.

A LETTER FROM MR. HERBERT SPENCER.

To the Editor of The Monist :

As I feel it a duty to reserve, for other purposes, the very small power of work now left to me, I am obliged to decline entering upon a controversy. I must leave readers to examine for themselves—little hoping, however, that they will do so.

One point only I wish to note. The use of the expression "forms of thought," instead of "forms of intuition," was simply an inadvertence; as will be manifest on observing that though I have used the wrong expression in the note, I have used the right expression in the text (p. 203), as also throughout my criticism of Kant's doctrine in *The Principles of Psychology*, Part VII, Chapter IV, "The Reasonings of Metaphysicians," § 399.

HERBERT SPENCER.

LOGIC AS RELATION-LORE.

In the French *Revue Philosophique*, in the August and September 1891 numbers of the same, M. George Mouret has an essay entitled "Mathematical Equality" in the course of which and as though subsidiary to his ostensible purpose he discourses upon the topics of relations and concepts and upon the fundamental elements of logic in general. His essay is really more important as a contribution to logical doctrine than as a treatment of mathematical equality.

The scope of his discourse will be seen by reference to his closing paragraphs in which he sums up what he considers to be the results achieved by him in his essay. Therein, he says that he has "treated of the general theory of the composition of concepts and relations and set the foundations of the logic of analysis and the logic of definition."

I. THE SPENCERIAN AXIOM.

The determining factor of every philosophical dissertation is of course some very general supposition which is taken as established and which exercises a controlling influence over all the observations of its author.

In this case this determining supposition is found in what M. Mouret calls his "*axiom of symmetry*." The same is thus stated by him "*Two things which have the same symmetrical relations to a third thing have between them that same relation.*"

M. Mouret is not one of those scholars that lack hospitality for other writings than those of their own nationality. From this fault so noticeable in the work of so many of the French scholars M. Mouret himself seems to be free. Indeed so far as regards the previous work done in the domain he sets himself to examine, he accords almost exclusive esteem to the writings of English thinkers. In fact he declares himself so far as regards his present topic a disciple of Mr. Herbert Spencer and puts his "axiom of symmetry" as an adaptation of that maxim of his said master which is of the tenor as follows, viz: "*Things which have a definite relation to the same thing have a definite relation to one another.*" This maxim, as Mr. Spencer tells us, was suggested to him by a remark of the late eminent author who is known to the world under the pseudonym of George Eliot, who herself stated it under the form "*Things that have a constant relation to the same thing have a constant relation to each other.*"

Those who are well acquainted with the psychology of Mr. Spencer will recognise that this maxim of his is made by him the very backbone of all his observations upon reasoning. If it has the validity which he imputes to it, it has an importance which it will be hard to overestimate, but if on the contrary, and as we shall submit, it is in every form in which it has been stated, certainly unsound and misleading, it is high time that its virtue should be brought into question.

The *dicta* of the masters whether they first enounce the same or whether they only give currency thereto by their ratification are always proper subjects for special scrutiny. There is always found a disposition to accept them on their mere *ipse dixit* without any attempt at criticism or independent observation. This is decisively *not* the scientific mood or mode. The spirit of that modern leaven that is currently referred to under the name of Science is characteristically a critical one, and one that is considerably irreverent in regard to the authority of mere personality. In this it is happily distinguished from the spirit that has marked the past history of what may be called the "regular" schools of philosophy.

M. Mouret is not alone in his inadvertent esteem for the maxim in question. In the issue of *Mind* for October 1891 Mr. L. T. Hobhouse publishes an article entitled "Induction and Deduction," in which he gives an undue appraisal to the worth of the maxim under consideration, even though the author of the article seems to be well aware that said maxim stands in much need of qualification.

We venture to say that this maxim in all its forms has gained whatever currency it has enjoyed in virtue alone of the incompetent comprehension that too generally prevails in regard to the nature and characteristics of that sort of things that are relations.

A notable example of this lack of comprehension is supplied in the logical treatise of Mr. Carveth Read, a work ostensibly founded upon the significance of the

category of relation and yet in which at the very start the author tells us that a relation is something which is indefinable.

II. IMPORTANCE OF RELATION-LORE.

This topic of relations is one that is neglected in a degree that reflects no credit upon the pretensions of those who undertake to instruct others in matters logical and philosophical. The thing itself is in the thinking of every one and the term and its derivations are in universal use. They are used as though they imported an idea that no one was liable to misapply or to misunderstand. The truth, however, is that of all the stock terms in our graver discourse this very word "relation" and its derivatives are the ones that are oftenest heard and read without any lucidity of mind concerning their proper intent as a part of their context. They are used with an assortment of meanings and non-meanings that are quite distracting to try to follow and quite vain to try and reconcile. In particular the difference between *relationship* and *relation*, between the *ground* or *foundation* of the relation and the relation itself, between the plural fact, whether of tendency, interaction, transition, or *status*, that is a co-condition with the relations, and the relations that co-condition that same plural fact, is constantly ignored in thinking and in the expression thereof, to the more or less confusion in, and inconsequence of, the whole discourse delivered.

It is no slight commendation of the perspicacity of M. Mouret to observe that he has discovered that the way towards a resolution of the problems he sets himself to work out lies through what to him appears the altogether unexplored regions of relation-lore, for it is evident that he regards himself as a pioneer in this field.

III. WORKS ON RELATION-LORE IN THE ENGLISH LANGUAGE.

In observing this we cannot but hold M. Mouret unfortunate in not having been put upon better lines of inquiry. He seems to have been wholly unaware of the treasures of investigation in this domain that exist in the English language and that for many years have been available for the student. His case in this respect is seen in the exaltation which he gives to the semi-popular discourses of Mr. Spencer and Mr. Read, as contrasted with the profound researches of DeMorgan and Boole and their disciples. It is evident that he has judged concerning the comparative quality of the various lines of English research not after an examination of his own, but after the current popular renown. For example, he speaks of the work of DeMorgan and Boole as presenting "only a simple mode of representing some of the logical laws" and as being "surrounded with a formidable and complicated apparel which disguises the value of their tentatives."

Since M. Mouret is manifestly an earnest student of the topic of relation-lore this language shows that he has at best only a second or third-hand knowledge of what DeMorgan and Boole really did. He ought to have known that in the recondite field of research in question all really competent treatment of the same would be very far from having any "popular" quality. For a man to discourse of relation-

lore in ignorance of what DeMorgan, the very father of the "Logic of Relatives," accomplished is like discoursing of Darwinism in ignorance of "The Origin of Species."

We opine that when M. Mouret shall have consulted the great memoir of DeMorgan in the tenth volume of the "Cambridge Philosophical Transactions" or better, when he shall have become acquainted with the more developed work of Mr. C. S. Peirce, to whom beyond question relation-lore is most indebted for its present state of progress, he will have a better esteem for the value of the "tentatives" of DeMorgan and Boole and their disciples. Mr. Peirce has published three principal papers on the subject in question. The first of these was published in 1870 in the ninth volume of the "Memoirs of the American Academy of Arts and Sciences." Then in 1880 and in 1884, while Mr. Peirce was lecturer on logic at Johns Hopkins University, he published in the *American Journal of Mathematics* two papers dealing more or less extensively with relation-lore. One of these his "*Hauptwerk*" as it is called by Professor Schroeder of Carlsruhe, appears in the third volume of the journal mentioned and the other in the seventh volume of the same. Mr. Peirce was one of the contributors to our new American "Century Dictionary," and in that work under the definitions of Relation and Relativity there appears a summary treatment of the subject which is as we take it the work of Mr. Peirce and which might have given to M. Mouret hints which he would have appreciated. Also the editor of this magazine in his article "Are there Things in Themselves?" in the January 1892 number thereof incidentally touches upon the topic under consideration in such a way as to correct some of the more inveterate misconceptions.

IV. M. MOURET'S THEORY OF RELATIONS.

The article of M. Mouret is in so many points so excellent a discourse that the chief reflection one is inclined to make is that upon its own principles it ought to have been better. He seems to have been widely awake to the primordial nature of relations as philosophical data. He says: "Every notion or relation is a *function* of relations more directly known and enters as a relational element into other relations less proximate to the common sources," and also that "every concept or notion ought to resolve into a group of relations."

By such tokens as these we naturally look to see M. Mouret making it his very first concern to explain fully the nature of those primordial data that are relations. Indeed he seems himself to be fully aware of this natural expectation for he says: "What then is a relation; what is a concept or notion? To this double question an answer is necessary and a precise answer not consisting in the substitution of one form of words for another form of words bearing the same meaning or no meaning at all."

We cannot however find that he has done this. Instead of it and almost while saying that every concept and notion ought to resolve in a group of relations

he announces, "What I have to examine is the constitution, the structure of these *relation-generating groups*." Thus he starts with a synthesis when what is needed is analysis. He starts with supposing a group of relational elements indeterminate in number and proceeds to inquire as to the conditions that must subsist with regard to them, respectively and in combination, in order that a *definite* relation may subsist as to a pair of the relational elements. These conditions he finds to be four in number. First, he finds that—

"It is necessary that every one of the terms of the group should be connected one to the other by *definite relations*; that between any two terms there must always be intermediate terms that connect them in a continuous way." This he calls the condition of "Solidarity." Secondly, he finds that there must obtain the condition of *Co-Existence*. By co-existence he intends—

"Not a definite co-existence in time, that is to say, a relation of simultaneity or concomitance, nor yet that established co-existence which constitutes the causal relation, but an indefinite co-existence independent of the order of its terms and of all consideration of time or duration."

Having thus supposed his group all well stocked with relations, he proceeds to relegate most of them to the limbo of inconsequence by invoking a *principle* which he calls the principle of *indetermination*. By virtue of this principle in every particular case the *particular determinations* of all the terms become indeterminate and those of the intermediate terms doubly so. Thus the supposed facts of the case become fit for the existence of the *Third* condition, that of *Abstraction*, and for the arising of a general concept or notion.

But corresponding to every concept or notion is its negative or opposite concept or notion. As this negative depends necessarily upon certain *particular determinations* of the same terms that bear the *particular determinations* and which being singly indeterminate admit of the positive concept or notion, there necessarily must obtain two systems of singly indeterminate *particular determinations* relative to but incompatible with one another, and so relative that the negation of one set entails the obtaining of the other set, or in other words either set being negated entails the obtaining of the other set. These facts constitute what M. Mouret calls the *principle* of *incompatibility* and involve his *Fourth* condition of *Relativity* stated by him as follows:

"All the particular determinations of the extreme terms must not be compatible with the system and the negation of certain relations of the system must entail the negation of the relation which they make between the extreme terms."

V. REFLECTIONS ON M. MOURET'S THEORY.

Now we cannot regard this as a successful attempt to explain the nature and characteristics of relations, or to unfold the involutions of relation-lore.

We fully realise that if every concept or relation resolves into a group of relations we must in some form or other take what are relations in reality as data to be-

gin with, but this does not prevent us from taking our datum terms for our turn of explanation as not requiring at present any recognition other than as relational elements. What is needful as a prime requisite on the very start of any research in relation-lore is to obtain a clear idea of what is meant by a relation. Meanings are primarily matters of mental status. We have to determine the relation that subsists between the mind and the object through the mediating interpretation of a word, and the mental affection lies nearest and logically comes first. It may very well be that the mental affection requires correction, but this cannot take place until its faults are observed, and these cannot become evident until the mental affectionis itself duly understood.

The disciples of that school of logic in which De Morgan and Boole, both eminent mathematicians, hold so exalted a rank as discoverers, regard cognition as arising in consequence of brain functioning or *mental operation* and study the results of this operation as yielding their import in dependence upon and only in dependence upon the proper operation in virtue of which they arise.

Now no cognition whatever, even of the most elementary sort, arises except in connection with and in consequence of that operation of the sensibility which is *distinction*. Distinction is of multitudinous and manifold aspects. In all its phases whether it be passive or active it is naught else than the arising or the assigning of relations. The attempt to posit an unqualifiedly absolute—that is, an unqualifiedly unrelated—universe of discourse must be futile and blank, necessarily and insuperably. Any form of notation that pretends to express such a universe of discourse, is only saved, if at all, from being unqualifiedly nonsensical, by standing as antithetical—that is, by being *related* to forms of notation that express relation and nothing else than relation. This rigorously prime operation of distinction is not only pure relation-ing but it is of that sort of relation-ing that is at once a distinguishing and a conjoining. The "One and the Many" are insuperably implicit therein. Distinction having operated to various extents, and thereby various relations having come into view, we become aware of those items of experience that are objects or facts. Each and every one of these objects or facts are in truth distinguished and are therefore in no strict sense *indiscernible* from each other, but since no science can possibly obtain in relation to mere particulars we find it useful to disregard various points of distinction that obtain in respect to various objects and facts and to converge our regard upon the points wherein distinction, not absolutely vanishes, but *tends to vanish*.

By this operation, which is *abstraction*, various objects and facts become in mental regard fit and useful to be taken as copies of one another and as indifferent for use in most of the turns of mental life.

There are indeed various relations, objects, and facts, with respect to which no further operation or operations of distinction than the mere distinctions of the time, the place, or the occasion of their various manifestations have been applied nor can without great difficulty be applied. But we are therefore by no means entitled

to say that such are in truth irresolvable. Contrarily, and reasoning inductively we are justified in concluding that every relation, object, and fact will under analysis of adequate power resolve without limit into other relations, objects, and facts.

We are not yet prepared to see that the ultimate components of relations, objects, and facts resolve into relations, and nothing but relations, because we are not yet prepared with an explicit idea of the nature and characteristics of these elementary objects.

The study of M. Mouret since it starts with relations combining them under the conditions of Solidarity Co-Existence, Abstraction and Relativity, (which are nothing else than other relations or compounds of relations,) does not seem to us to advance us at all in the most fundamental requisite. He says no more than to say that in order for the groups of relations to generate further definite relations the relations thus grouped together must be related to one another and then that most of these relations must be disregarded.

M. Mouret distinguishes, with respect to a relation three factors, the *Matter*, or the relational elements grouped together, the *Form*, or the order in which the relational elements are arrayed, and the *Foundation*.

As his study of the topic of relations is professedly for the purpose of enabling him the better to solve the nature of the relation of mathematical equality, his success may be estimated by reference to his conclusions in regard to that relation. These are as follows: "The relation of equality is formed of undetermined matter, it possesses a binary form, and has for a condition a relation of indiscernibility between the two elements."

Such conclusions appear to us to be impotent not to say erroneous. If two things obtain at all, they obtain as two and not one, in very virtue of being distinguished the one from the other. Except with regard to some more or less arbitrary distinctions, like the distinction between co-incident points, all distinctions obtain only in virtue of some relation that can be nothing else than a point of *discernibility*. Numbers and other mathematical things are taken as not-different not because they are in truth indiscernible but because for the turn in hand their points of difference are irrelevant.

Concerning the much mooted question of the proper field of logic as a science M. Mouret holds it to be the "science of relations and general concepts." Although we hold that logic is particularly concerned with the lore that is more directly related to the phenomena of erroneous thinking and its correction, the view of M. Mouret is not unacceptable. "Reasoning consists in the observation that where certain relations subsist certain others are found," as Mr. Peirce has remarked.

VI. CONCERNING MEANINGS AND EXPLANATIONS.

As preliminary to our account of relations we will make an observation which seems to us of considerable use in connection therewith. It is not without its bear-

ing on the theory of definition or rather upon the broader theory of explanation. With M. Mouret we hold that every concept and relation resolves into a compound of relations. Since relations are data that are absolutely elementary at least so far as we are at present instructed they are of course not subsumable under any other sort of data that are better known. Moreover, whatever explanation we here make must needs be made by means of written words. Thus an important question arises as to what method is to be pursued in this special exigency. The theory of definition leads us to the same difficulty, for although the meanings of many words can be defined in terms that are more proximate to the elementary relations, we will always come at last to terms that admit of no improved explanation by such a method. There is no device of words that can evade or supersede the ultimate recourse to things. Now the significations of words are learned in most cases not so much by definitions and verbal descriptions as by *the observation of the various applications of the words*. Indeed this is the primitive way in which the meanings of words are found out. The child knows nothing of what, say, the word *horse* means until some one shows it an actual horse and may be pointing to it says repeatedly, *horse*, in such a way as to excite the observation of the child to the intended application of the word to the thing. This is because the relation of every general sign to its object subsists only in consequence of a mental association, and until this mental association is created the sign has no meaning. The methods of evoking these mental associations are at present quite unmethodical and do not receive the attention which their importance merits. One feasible method is to present or to state a number of scenes that shall present the object in various ways in connection with the sign thereof, and thus to excite attention to the proper application of the sign. The geometer does this by means of his diagrams without which or their mental counterparts all his mere words would be in vain.

Mr. Edward T. Dixon has lately published a work on the "Foundations of Geometry" in which he would introduce as a fundamental datum what is really an altogether new and exceedingly abstract conception which he calls by an old name, that of *direction*. The old term has never been as yet taken in any abstract universal sense because apart from definite right lines showing it as an attribute any abstract universal meaning is wholly unassignable. But the conception that Mr. Dixon would instal is removed in abstractness from such a universal yet one more step in universality. A three-fold infinity of right lines differing in direction can be drawn in ordinary space to each of which pertain two corresponding universals of direction, one converse to the other. Now the conception of direction that Mr. Dixon proposes for service as an elementary geometrical datum is the universal that subsumes all these lower ranking universals as particulars. Of course he has difficulty in even trying to explain what he means. Realising the impossibility of subsuming it in any way he takes a method which if it were more thoroughly applied, and wholly emancipated from the lingering notion of definition, might have been more successful. As he actually left the matter his real meaning

can only be drawn from close study of the way in which he applies the term in his discourse in general.

Owing to its excessive abstractness his conception is wholly unfit for service in elementary geometry. One has to become a good geometer before the conception can even be approached.

VII. ANOTHER THEORY OF RELATIONS.

We shall proceed to explain what we regard as a true and adequate notion of a relation by stating some scenes that display the same. We do not regard it as needful to state many of them and we take for our first one, the common transaction of making a donation. We have here for relational elements or terms as they are usually called a set of three. Separately, or as not yet brought into relation in virtue of the giving, there may be, say G an owner of W a watch and R the intended beneficiary. The plural fact of the giving is the *relationship* or the *foundation* of the *relations* that arise in virtue of said giving. This *foundation* becomes to be in virtue of the creation of such relations by the giving. Either one of the set of three may be taken as the datum of reference and according to the election in this respect, the relations may differ and the technical names we are about to give will vary in their application. Since simplicity will be gained thereby and also our present turn fully subserved we will take G as the datum term of reference. So taking it G is called the *relate* and both W and R are called the *correlates*. For this present turn and in very virtue of the giving and only in virtue thereof G becomes related to W and R in a certain relation one of the names of which is giver. When W or R are taken as relates certain other relations appear, some of the names of which are respectively *present* and *recipient*. In relation to the relation of giver the relations of present and recipient are named *converse* relations, as are likewise the relations of present and giver to the relation of recipient and the relations of giver and recipient to the relation of present. Here are three distinct relations growing out of the same relationship or foundation. As each relational element has its corresponding negation, the true logical system of a set of three terms involves not less than eight relations.

We take for our second scene the case of a boundary. This might be a surface or a point but we will take the special case of a line on a surface. Here we have again a set of three, the spread on one side, A, the opposite spread, B, and the line L. A has a certain relation, say above, to L and B, B has the certain relation, below, to A and L, which relation is converse to the relation above: and L has the certain relation, boundary, to A and B which relation is converse to the relations above and below.

The two examples now given are cases of the *conjugative* kind. The relationship is a conjugative one and the relations are conjugative relations. The distinguishing characteristic of a conjugative case is the fact essentially involved of the mediation between relational elements by another certain element, or in other

words the bringing of diverse relational elements into relation by the function of another relational element. Without the mediation or function of this conjugating element neither the relationship nor the conjugative relations can exist. There is reason to believe that all conjugative cases can be certified as cases of three relational elements or as compounds of a number of such sets of three. To ordinary uncritical thought which is largely constrained by the trammels of ordinary language the most abundant sort of relations appears to be of that sort that are taken to involve only two relational elements. These are cases of what are called *dual* relationships and the relations that arise out of them are called *dual* relations. Such are those like father, son, husband, wife, etc. Strictly viewed they ought to be regarded as *degenerate* relationships and relations just as a pair of lines is regarded as a degenerate conic.

VIII. CAUTIONS AND APPLICATIONS.

Now besides the error of confounding relations with relationship, it is a very common fault to think and speak of a relation as being *between* two or more terms. This imports into thought the thoroughly misleading idea of an intervening independent existence for relations. Relations are attributive predicates of terms and each one of them pertains strictly to its proper term or combination of terms, in the same sense for this turn (*pro hac vice*) that qualities are held to pertain to their so-called substances. And yet relations so pertain to their proper terms not in virtue of such terms separately but in virtue of their membership in the plural fact which obtains as the *relationship* or *foundation*. The notion of a relation as a "betweenness" has perhaps been fostered by the exact coincidence of relations pertaining to the several members of the same relationship. When on contemplating the connection, say of two points, we observe that the distance of one from the other is apparently indistinguishable from the distance of the other from the one, we naturally overlook the fact that we are truly to regard the connection as the coincidence of two really distinct relations, and regarding the pair of relations as one thing and finding it not attributable to one point more than to the other we dissociate it from both. But when we consider a pair of relations that are converse to one another and that arise out of a dual relationship like that of husband and wife we may see that there is *no* betweenness, no single relation that interlies, but two relations, one the relation of husband and the other the converse relation of wife.

An interaction, say like that of approach under the influence of gravitation, is a relationship. Each body stands in the relation of a *puller* of the other and the mediating term which we find impossible to argue out of the account we call the attraction of gravitation. In this case the relation of action of the one body is not usually distinguished from the relation of action of the other one. Indeed this is the case in all cases of mechanical action and we lay it down as a maxim that action and reaction are equal but they are not alike since their directions are opposite.

Sensation is a relationship, since it is our interaction. The object interacts with the brain. As to the conjugating term we are as yet in the dark and so we are in the habit of regarding this case as a dual relation. The relation of the brain to the object is that of a *knower* and that of the object to the brain that of a *stimulater*. Each character or mark of the object that becomes apparent gives rise to relations and their respective converses each correlative pair of which are respectively so many distinct interactions of detail in the entire interaction. Whatever an object as known to us is, it is in virtue of those relations of brain action and detailed object stimulation, which are relations and always relations. Since consciousness exists only by the arising of relations of distinction, supposably in consequence of internal brain interaction, is it presumptuous to allege that consciousness consists of relations or a complex of relations?

IX. NATURE OF OBJECTS.

With regard to the object no one can prevent whoever may be so disposed, from imputing to it various points of possession that do not and cannot interact with the brain. So far as such imputed points are regarded as merely not yet interacting but possible to interact with knowing substance such points in no wise differ in essential nature from the known attributes. They are potential relations and nothing else. But in so far as they are regarded as essentially impossible of ever interacting with knowing substance in any possible stage of its development such regard is pure nonsense and utterly without any assignable meaning. There is no occasion whatever for such an imputation, for the existence of interaction actual or potential is fully adequate to explain all that will ever present itself to be explained.

At this point let us instruct ourselves with an example of the reasonings of a much and deservedly honored philosopher. He says:

"In the most general predicate which is *determined* Being or *existence*—for all things in the universe are determined beings—we have an evident two-foldness (a composite nature) which allows of a further analysis into pure Being and determination."

We will parallel this analysis. For the sake of simplicity we will take a limited right line. It has the determinations straight and long, not length in the sense of measure, for length is ambiguous in its intent, but length in its qualitative sense—its linearity so to speak. Now separate from it first its straightness without however giving to it any other determination, and then its quality of longness. We have then a *pure* line, that is neither straight, nor long, nor anything else. Such is an example of "Pure Being." *We* say however that its very being as a line is absolutely dependent on its determination as a long line; that such a determination alone constitutes it a line, is at once its determination and its being, that there is no two-foldness at all but only two names, and that as one-fold its determination as long and its being vanish together. What is true of a line is true of all relations and compounds of relations whatever.

Thus not only all knowledge but all existence so far as that term can ever have any meaning is relative; relative to all intents and for every possible turn.

To those who accept the essentials of this account of relations it will be easy to see what is the nature of an object and that of a concept or notion. An object is a relation or some congeries of relations that usually present themselves as a coherent whole to our sensibility or to consciousness. This is primarily effected in virtue of some efficacy which we cannot appropriate to ourselves, and so we distinguish our own personality from that manifold that we call the objective world. It is pure self-stultification after having made this most useful distinction to try and abolish it. Nothing but an utter abolition of all useful thought can result from so taking the data of experience.

X. NATURE OF A CONCEPT.

But objects are individual and generally found with various points of distinction some of which are irrelevant to most of the turns of mental life. We therefore neglect the irrelevant points and take many objects as copies of one another. This process is *not* the formation of the concept or notion but it suggests and prompts that formation. We cannot but regard it as an error to take a conception as a *sum* of individuals. It seems to us to be rather in the nature of a *locus*. A curve contains an infinity of points and yet the curve is not any sum of points even though it is often allowable to speak of it as the sum of all its points. So any concept, say, man, is not all the men that now live nor yet all the men that eternity both backwards and forwards has contained and will contain. A concept is a manifold and strictly universal and infinite in respect to the particulars it subsumes. We speak of the infinitive mood of a verb because the meaning of the word as thus taken is not put under any modification. In like manner the meaning of any concept though subject to various limitations in its applications is as a concept merely to be regarded as obtaining in a purely infinitive sense. Professor Jevons found a difficulty in classifying what he called *material* terms, such as stone, sand, water, etc. Other logicians have put such terms as singular terms, while still others have classed them as general terms. There is a great variety of such terms. Potatoes, wheat, butter, ice, cattle, water, hydrogen, the names of all the elements, ether, electricity, time, space, love, virtue, etc., are instances. It seems to us that such terms are the normal types of general terms and that the canonical forms of our universal propositions ought to be unquantified not only as regards the predicates but also as regards the subjects. Why not "man is animal" just as "lard is grease" or "man is mortal" just as "butter is cheap"?

Moreover the distinction between a general concept and one that is called singular is only one of degree and not of kind. Every so-called singular term is potentially at least only an individual instance under a possible general or universal concept. A striking example of this potentiality is furnished by the modern generalisations of that formerly singular term, space. If these observations are well

"Our natural way of thinking about these coarser emotions is that the mental perception of some fact excites the mental affection called the emotion, and that this latter state of mind gives rise to the bodily expression. My theory, on the contrary, *is that the bodily changes follow directly the perception of the existing fact, and that our feeling of the same changes, as they occur, is the emotion.* Common sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect, that the one mental state is not immediately induced by the other, that the bodily manifestations must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we strike, cry, or tremble, because we are sorry, angry or fearful, as the case may be. Without the bodily state following on the perception, the latter would be purely cognitive in form, pale, colorless, destitute of emotional warmth. We might then see the bear and judge it best to run, receive the insult and deem it right to strike, but we should not actually *feel* afraid or angry.

"Stated in this crude way, the hypothesis is pretty sure to meet with immediate disbelief. And yet neither many nor far-fetched considerations are required to mitigate its paradoxical character, and possibly to produce conviction of its truth.

"To begin with, no reader of the last two chapters will be inclined to doubt the fact that *objects do excite bodily changes* by a preorganised mechanism, or the farther fact *that the changes are so indefinitely numerous and subtle that the entire organism may be called a sounding-board* which every change of consciousness, however slight, may make reverberate. . . .

"The next thing to be noticed is this, that *every one of the bodily changes, whatsoever it be, is* FELT, *acutely or obscurely, the moment it occurs.* . . .

"I now proceed to urge the vital point of my whole theory, which is this: *If we fancy some strong emotion, and then try to abstract from our consciousness of it all the feelings of its bodily symptoms, we find we have nothing left behind,* no 'mind-stuff' out of which the emotion can be constituted, and that a cold and neutral state of intellectual perception is all that remains. It is true that, although most people when asked say that their introspection verifies this statement, some persist in saying that it does not. Many cannot be made to understand the question. When you beg them to imagine away every feeling of laughter and of tendency to laugh from their consciousness of the ludicrousness of an object, and then to tell you what the feeling of its ludicrousness would be like, whether it be anything more than the perception that the object belongs to the class 'funny,' they persist in replying that the thing proposed is a physical impossibility and that they always *must* laugh if they see a funny object. Of course the task proposed is not the practical one of seeing a ludicrous object and annihilating one's tendency to laugh. It is the purely speculative one of subtracting certain elements of feeling from an emotional state supposed to exist in all its fulness, and saying what the residual elements are. I cannot help thinking that all who rightly apprehend this problem will agree with the proposition above laid down. What kind of an emotion of fear would be left if the feeling neither of quickened heart-beats nor of shallow breathing, neither of trembling lips nor of weakened limbs, neither of goose-flesh nor of visceral stirrings, were present, it is quite impossible for me to think. Can one fancy the state of rage and picture no ebullition in the chest, no flushing of the face, no dilatation of the nostrils, no clenching of the teeth, no impulse to vigorous action, but in their stead limp muscles, calm breathing and a placid face? The present writer, for one,

certainly cannot. The rage is as completely evaporated as the sensation of its so-called manifestations, and the only thing that can be supposed to take its place is some cold-blooded and dispassionate sentence, confined entirely to the judicial realm, to the effect that a certain person or persons merit chastisement for their sins. In like manner of grief: what would it be without its tears, its sobs, its suffocation of the heart, its pang in the breast-bone? A feelingless recognition that certain circumstances are deplorable, and nothing more. Every passion in turn tells the same story. A purely disembodied human emotion is a nonentity." (P. 449 seq.)

It is, of course, impossible for me to give all the arguments by which Professor James attempts to establish his position; the above quotations will make it clear what it is—namely, that all our "feelings" are sensations.

Before proceeding to consider some of the objections to this view of the matter, it may be well to notice briefly what seems to be a gap in the author's treatment of it. In adult human beings, very few, comparatively, of what are ordinarily recognised as emotions follow directly upon the perception of their objects, in the ordinary sense of the word. His theory might perhaps suffice, without further explanation for such cases as the "spitting" of blind kittens at the smell of a dog, or the rage of a bull at the sight of a red cloth, or the startled feeling that we experience at a loud and unexpected sound, if the latter should be called an emotion. But in the immense majority of instances the emotions of which he treats arise in a very different way.

Some of his own illustrations will serve as well as any to show this. For instance, neither running nor any other of the symptoms of fear which he enumerates is the necessary result of seeing a bear. A chained or caged bear may excite only feelings of curiosity, and a well armed hunter might experience only pleasurable feelings at meeting one loose in the woods. It is not, then, the perception of the bear that excites the movements of fear. We do not run from the bear unless we suppose him capable of doing us bodily injury. Why should the expectation of being eaten, for instance, set the muscles of our legs in motion? "Common sense" would be likely to say it was because we object to being eaten, but according to Professor James, the reason we dislike to be eaten is because we run away. So, again, striking is not a reflex act, following on the hearing of an insult as sneezing does on taking snuff. Whether the muscular movements or the emotions are the primary thing, what both shall be depends on many things besides the words that are spoken. To be accused of drunkenness or unchastity, for instance, would dispose some persons to violence, but others might feel only the stirrings of pride at what they would consider a tribute to their manhood. In those who considered such a charge opprobrious, it might excite feelings of amusement, contempt, pity, or grief towards the one making it, according to the estimation in which he was held. To say that if it makes us strike we shall be angry, if it makes us laugh we shall be amused, if it makes us weep we shall be grieved, does not go to the bottom of the matter. According to the theory, the thought of the estimation in which we

are held by others is, in itself, entirely indifferent to us, and only affects our feelings through the muscular movements it excites.

In view of the variety of these movements in response to the same physical stimulus in a case like this, the statement that objects excite bodily changes by a preorganised mechanism explains nothing. We want to know why in one case a given perception excites one set of movements, and in another an entirely different set. Without attempting to decide whether or not a satisfactory explanation can be given on Professor James's hypothesis, I will only say, that, so far as I can see, he nowhere attempts it. In his section on "The Genesis of the Various Emotions," (pp. 477 seq.), he only discusses the question how the various feelings come to be associated with their respective movements. How the movements come to be associated with the perceptions, he does not discuss at all.

Turning now to the considerations which Professor James urges in support of his theory, quoted above, the first two—that objects excite bodily changes and that these changes are more or less distinctly felt—may pass unchallenged. I am disposed to go as far with him as to admit that these feelings, in the cases which he describes, may properly be considered components of the emotional state. But when he affirms that there is nothing else—that if we subtract our consciousness of peripheral sensations there would be no emotion left—it seems to me that he is going very much too far. I should have no hesitation in saying that such a statement of the case is contradicted by my consciousness, but as that would be merely setting up my consciousness against his, without the possibility of an umpire, I will call attention to some other considerations which seem to me to render it improbable.

In the first place, it is to be noticed that the cases he instances in illustration of his position are all of violent emotions. Admitting that we cannot have these emotions, in such degree, without movements such as he describes, nor even imagine how they would feel if such a thing were possible, it does not follow because they cannot be separated that they are identical. We do not reason in this way in regard to those feelings which are not commonly called emotions. I can no more imagine myself in intense bodily pain without a tendency to groan and writhe than deeply grieved without a tendency to weep, and yet no one, probably, would say that the pain consisted solely in my consciousness of the groaning and writhing. If grief is a kind of pain, it is to be expected that, in a high degree, it will produce bodily movements more or less similar to those excited by other sorts of pain. All these emotions, however, are capable of infinite gradations in intensity. The fear of losing one's pocket handkerchief is an emotion of the same kind as the fear of losing one's fortune. In Professor James's description of fear, it is evident that he has abject terror in mind. I hardly think it probable that he has any such sensations, when he fears, for instance, that he will be late to dinner, and yet he must be differently constituted from many of his fellow-men if his state of mind in such a case is merely a cold, intellectual cognition of the fact that such a state of affairs would be undesirable.

The same is true of the other emotions he mentions. The feeling of the ludicrous is, perhaps, the strongest case he cites, but in my own case slight degrees of amusement do not excite laughter, or even any conscious disposition to laugh. There is, at the most, in such cases, a tendency to smile, which may be overpowered by some other emotion, without in the least impairing my feeling of amusement. It seems to me certain that slight degrees of all the emotions mentioned may be unaccompanied by any distinct consciousness of reflex movements. In such cases it is only by a pretty strong effort of attention that we are able, if at all, to determine what the bodily changes are, although we are distinctly aware of the emotion.

Again, it is to be noticed that many actions, similar in character to those we have been considering, are not associated with what are commonly called emotions. Laughing and sobbing, for instance, are spasmodic movements of the muscles of respiration, not strikingly different from hiccuping, and there seems no good reason why the consciousness of the former two should usually be felt as strong emotional excitement, while the latter is not. In some cases, movements identical with those accompanying particular emotions may occur entirely independently of them. Shivering from cold, for instance, is the same sort of a movement as may occur in violent fright, but it does not make us feel frightened. The laughter excited in children and sensitive persons by tickling of the skin is not necessarily accompanied by any mirthful feelings. The act of vomiting may be the accompaniment of the most extreme disgust, or it may occur without a trace of such emotion. Professor James himself gives an instance of this sort that can hardly be bettered:

"The writer well remembers his astonishment, when a boy of seven or eight, at fainting when he saw a horse bled. The blood was in a bucket, with a stick in it, and if memory does not deceive him, he stirred it round and saw it drip from the stick with no feeling save that of childish curiosity. Suddenly the world grew black before his eyes, his ears began to buzz, and he knew no more. He had never heard of the sight of blood producing faintness or sickness, and he had little repugnance to it, and so little apprehension of any other sort of danger from it, that even at that tender age, as he well remembers, he could not help wondering how the mere physical presence of a pailful of crimson fluid could occasion in him such formidable bodily effects" (p. 457).

Here we have a condition such as is sometimes experienced in connection with the most extreme degree of fear or grief unaccompanied by any emotion except astonishment at its occurrence. I presume that if a person should faint on hearing bad news, Professor James would consider that one of the causes of his intense emotion. Why did it have no such effect in this case?

Assuming that the emotions are the effects and not the causes of what are usually reckoned as their "expression," it seems evident that a given movement or set of movements must uniformly, at least in the same subject, give rise to the same feeling, and that in the case of opposite emotions such as joy and grief, hope and fear, the more intense the emotion, the more unlike must be the actions from which

it arises. Neither of these is the case. On the contrary, it would seem to be the fact that the actions accompanying emotion tend to become more alike in proportion to its intensity. It is not at all uncommon for people to weep from excess of joy as well as of grief. Pallor and trembling are frequent accompaniments of the extremes of hope as well as fear. The naturalist Wallace gives an account of his feelings on capturing a rare and beautiful butterfly, which is worth quoting in this connection:

"The beauty and brilliancy of this insect are indescribable, and none but a naturalist can understand the intense excitement I experienced when I at length captured it. On taking it out of the net and opening the glorious wings, my heart began to beat violently, the blood rushed to my head, and I felt more like fainting than I have done when in prospect of immediate death. I had a headache the rest of the day, so great was the excitement produced by what will appear to most people a very inadequate cause" ("Malay Archipelago," p. 342).

Here it is evident that a feeling of intense exultation gave rise to sensations very similar, to say the least, to those of extreme fear.

One other argument brought forward by the author deserves special notice in this connection:

"The best proof that the immediate cause of emotion is a physical effect on the nerves is furnished by *those pathological states in which the emotion is objectless*. One of the chief merits, in fact, of the view which I propose, seems to be that we can so easily formulate by its means pathological cases and normal cases under a common scheme. In every asylum we find examples of absolutely unmotived fear, anger, melancholy, or conceit, and others of an equally unmotived apathy, which persists in spite of the best of outward reasons why it should give way. In the former cases we must suppose the nervous machinery to be so 'labile' in some one emotional direction that almost every stimulus (however inappropriate) causes it to upset in that way, and to engender the particular complex of feelings of which the psychic body of that emotion consists. Thus, to take one special instance, if inability to draw deep breath, fluttering of the heart, and that peculiar epigastric change felt as 'precordial anxiety,' with an irresistible tendency to take a somewhat crouching attitude and to sit still, and with perhaps other visceral processes not now known, all spontaneously occur together in a certain person; his feeling of their combination *is* the emotion of dread, and he is the victim of what is known as morbid fear" (p. 458).

Now, it is evident, of course, in such a case as this, that such a combination of feelings as is here described is not a fortuitous coincidence of so many independent sensations. They must have a common starting-point, which cannot well be elsewhere than in the brain. But if this is the case, it seems to me to be begging the question to assume that the sensations and not the emotion are the primary thing. On the assumption that fear, in the normal condition, is the cause of the disturbances of respiration, circulation, and the like, which accompany it, it is as easy to formulate normal and pathological cases under a common scheme, by supposing it to be the cause of the like disturbances in cases of morbid fear, as on the theory of Professor James.

It seems to me, then, that the theory does not satisfactorily account for the facts, so far as the involuntary, reflex accompaniments of motion are concerned.

The difficulty is greatly increased when we consider the relations of emotion to voluntary action. We have seen that reflex acts, similar to, or identical with those in which Professor James believes emotion to consist, may occur independently of emotion, in the ordinary acceptation of the term, at least. Strictly voluntary acts, on the contrary, are always the concomitants of emotion of some sort. In the great majority of the ordinary actions of life, they are the only motor phenomena of which we are aware in this connection. Our whole daily conduct, in our business and pleasure, our incomings and our outgoings, our downsittings and uprisings, is inseparably associated with our likings and dislikings, our hopes and fears. What is the nature of this association?

Under the theory we are considering, two relations of voluntary acts to emotion are possible. They may, like the involuntary reactions, constitute the emotion, or unlike them, result from it. Professor James does not express himself on the general question, but some of his illustrations seem to favor the former view. If the man who meets a bear is frightened because he runs, or the one who is insulted, angry because he strikes, the voluntary acts of running and striking must, in part, at least, constitute the emotions of fear and anger in these cases. Let us, then, consider this case first.

If I see a shower coming up, and run for a shelter, the emotion is evidently of the same kind, though perhaps less in degree, as in the case of the man who runs from the bear. According to Professor James, I am afraid of getting wet because I run. But supposing that, instead of running, I step into a shop and buy an umbrella. The emotion is still the same. I am afraid of getting wet. Consequently, so far as I can see, the fear, in this case, consists in buying the umbrella. Fear of hunger, in like manner, might consist in laying in a store of provisions; fear of poverty, in shoveling dirt at a dollar a day, and so on indefinitely. Anger, again, may be associated with many other actions than striking. Shylock's anger at Antonio's insults induced him to lend him money. Did the anger, or revengefulness, or whatever we may call the passion, consist in the act of lending the money? I hardly think it necessary to multiply instances in illustration of the fact that the same act is often associated with the most contradictory emotions, and acts which are ordinarily indifferent with the most intense feeling; that, in fact, there is no such uniformity in the associations of emotion with voluntary conduct as the hypothesis would seem to require. I incline to think that most people will believe, in the cases cited by Professor James, that the running and the striking are the results, not the causes of the fear and anger.

If we assume such to be the case, we are no better off under the hypothesis we are considering. Excluding voluntary movements, there is nothing left of the emotion, according to Professor James, but the consciousness of involuntary, reflex acts resulting from perception. The voluntary acts must, then, be directly caused by these. Now,

in the first place, it is often difficult, if not impossible, to tell what these actions are. What are the involuntary muscular contractions that impel a day-laborer to go to the place of his work, and keep his voluntary muscular system in strenuous activity all day, enduring fatigue and all the discomforts of the summer's heat or winter's cold? It would probably puzzle him very much to tell, although he has a very clear idea of why he does it. I doubt if, on his own hypothesis, Professor James himself would find it easy to explain the constituents of the emotions which impel him to go to the class-room at the appointed hour and conduct a recitation. But even in cases in which we are distinctly conscious of involuntary action, there seems to be no connection between it and the voluntary acts accompanying the emotion. In the case of the man running from the bear, for instance, trembling lips, weakened limbs, goose-flesh and visceral stirrings have nothing to do with running, but, on the contrary, would rather tend to prevent it. In fact, it may be said, in general, that the two classes of emotional activities are mutually antagonistic. The more involuntary the action, the less efficient the voluntary activity is apt to be, as any one knows who has had an attack of the "buck ague." We should have, therefore, diminution of the effect with increase of the cause.

It seems, then, on the hypothesis, impracticable to account for the association of voluntary action with emotion either on the supposition that the former is the cause or the result of the latter. A third alternative—that there is no relation of cause and effect in the case, and that the phenomena of emotion and action, although constantly associated, are really independent, I will not discuss, as it does not commend itself to my mind, and Professor James, elsewhere, expressly repudiates it. It seems to me that the only reasonable conclusion is that emotion is something different from either involuntary or voluntary muscular activity, and which may be the cause of either or both.

Professor James, after admitting that the view of the subject which he advocates is only a hypothesis, and that much is lacking to its definitive proof, goes on to say:

'The only way coercively to *dis*prove it, however, would be to take some emotion and then exhibit qualities of feeling in it which should be *demonstrably* additional to all those which could possibly be derived from the organs affected at the time. But to detect with certainty such purely spiritual qualities of feeling would obviously be a task beyond human power.....

"A positive proof of the theory would, on the other hand, be given, if we could find a subject absolutely anæsthetic inside and out, but not paralytic, so that emotion-inspiring objects might evoke the usual bodily expressions from him, but who, on being consulted, should say that no subjective emotional affection was felt. Such a man would be like one who, because he eats, appears to bystanders to be hungry, but who afterwards confesses that he had no appetite at all." (P. 455.)

Whether the truth of the first of the above paragraphs is to be conceded or not, depends, I suppose, on the strength of proof necessary for coercion. The only way, for instance, coercively to disprove the once prevalent theory that "lunacy" is due

to the influence of the moon would be to abolish the moon. Most intelligent people, however, at the present day, accept the fact that there seems to be no coincidence between the moon's phases and the phenomena of insanity as sufficient proof for practical purposes of the incorrectness of that theory. It seems to me that the facts to which I have called attention show a somewhat similar lack of correspondence in the case we have been considering. I am, however, unable to see why a case of complete anæsthesia, such as is supposed in the second paragraph, would not answer nearly as well for one side of the question as the other, according to the presence or absence of emotion. To suppose that cutaneous and visceral sensations are preserved unimpaired for purposes of emotion, while absolutely abolished for all other purposes, would be putting a pretty severe strain on the faculty of belief.

Such cases, as Professor James says, are hard to find. He refers to one, reported by Strümpell, in which a boy, anæsthetic within and without, with the exception of one eye and one ear, was stated to have manifested shame, grief, surprise, fear, and anger. He goes on, however, to say: "In observing him, however, no such theory as the present one seems to have been thought of; and it always remains possible that, just as he satisfied his natural appetites and necessities in cold blood, with no inward feeling, so his emotional expressions may have been accompanied by a quite cold heart."

Since Professor James's work was published, two cases have been reported by Berkley,* which, although not, perhaps, conclusive, are of interest in this connection. In the first, the patient, a woman of English birth, age not stated, had complete loss of sense of pain, heat and cold, pressure and equilibrium, of smell, taste, and sight. The sense of touch, although not completely abolished, was very greatly impaired. She recognised a hat, for instance, only after feeling of it for a long time and then seemed doubtful about it. Her sense of the position of the extremities was also very imperfect, although not entirely abolished; and there was some deafness, although not enough to render her incapable of conversation. With regard to her mental state, Dr. Berkley says:

"The psychical condition has undergone but slight change, she is possibly a little apathetic, with some slight tendency towards a melancholic tone, but when aroused and induced to converse for some time, this in great measure passes away. The memory is quite good."

Dr. Berkley was kind enough to give me the following additional information about this patient, who, at the time of writing, was still under observation:

"Since the coming on of the dullness in hearing there has been a considerable degree of apathy manifest. She is no longer conscious of the smaller noises that occur around her, but is very readily aroused by the voice, and then takes a lively

* *Two Cases of General Cutaneous and Sensory Anæsthesia, without Marked Psychical Implication.* By Henry J. Berkley, M. D., Baltimore. [Brain, Part IV. 1891.]

interest in what is said to her: for instance a few days ago the resident physician remarked to her that he was going to obtain a pair of crutches for her use; she laughed heartily at the idea, and said she would fall and break her leg at the first step."

In response to further inquiries, he writes as follows:

"1) Visceral sensations. The clearest evidence of visceral sensation I have noted in my article," [warning of the necessity of evacuating the bowels and bladder by a pricking pain in the lower part of the abdomen,] "no others were sufficiently definite to be described. For two years there has been no feeling of hunger or thirst, and as the diet has only been a few mouthfuls of milk at a time for nearly that period, there has been no feeling of repletion.

"2) When the patient laughs at a joke, there is a slight flushing of the face, besides the ordinary contraction of the facial muscles; she is aware that she is laughing, but besides acknowledging that she perceives no difference between the act now, and some years ago, she is unable to describe the sensation further.

"3) Anger. As I think I mentioned in my last letter, the patient has been a person of unusually equal temper; an outbreak of real passion has never been observed with her. When annoyed or teased by some of the other women, there is a distinct corrugation of the forehead, accompanied by an exceedingly slight general movement as if of aversion, no words, movement of the chest, clenching of the hands, etc. She describes the sensation as one of repulsion.

"Like Strümpell's case she shows definitely shame, grief, surprise, fear, and substituting for anger, repulsion.

"My own impression derived from observation of the patient is, that all mental emotional sensibilities are present and only a little less vivid than in the unanæsthetic state; and that emotions are approximately natural, and not at all coldly dispassionate."

In the second case, that of a Russian woman, aged thirty-five, there was complete loss of cutaneous sensibility in all its qualities: the sense of position ("muscular sense") was almost completely abolished; the sense of taste was absent in the anterior two-thirds of the tongue. Smell, sight, and hearing were preserved. She had left the hospital before the article was written. In regard to her case, Dr. Berkley writes:

"While in the most absolute state of anæsthesia (auditory and visual excepted) there was no departure from a normal psyche; the woman would sometimes be angered when she did not understand a question, at others would smile or shake her head, and would frequently laugh and talk with another Russian woman in the same ward. There was never the slightest apathy manifest after the first few days of febrile movement."

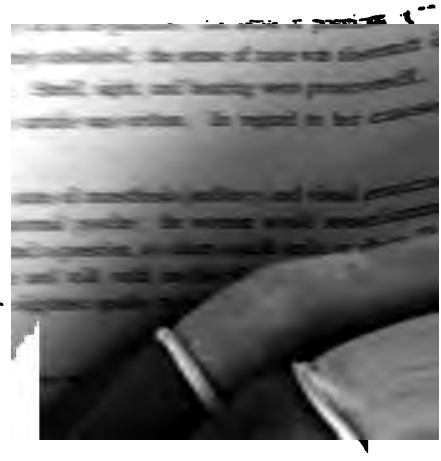
I give these cases for what they are worth. In the first, it is evidently impossible to entirely exclude the presence of sensations caused by the reflex acts, and the second, not having, apparently, been examined with special reference to the subjective side of her emotional manifestations, may be open to the same objection which Professor James makes against Strümpell's case. To me it seems extremely unlikely that, if the theory under discussion is correct, such an amount of anæsthe-

sia as existed in these cases would have produced no obvious effect on the emotions. The fact that voluntary acts were performed by both these patients as well as by Strümpell's case, seems to me conclusive as to the existence of emotions of some sort in all of them.

It seems clear to me, from the foregoing considerations, that there are serious difficulties in the way of accepting Professor James's theory as an adequate explanation of all the phenomena of emotion. On the other hand, I think it contains an important truth, and that, by calling attention to it, he has rendered a real service to psychology. In order to make it clear how far I agree with him, it will be necessary to consider just what feelings are to be classed together under the head of emotion.

If we touch our fingers to a live coal, we are conscious of a sensation of heat, and also of pain. If we take quinine into our mouths, it tastes bitter, and also disagreeable. So in regard to a very large proportion of our sensations, we recognise two elements—one which has to do with the qualities of the object, and another consisting of the pleasurable or painful way in which those qualities affect us. The former may be called the objective element in sensation. We think of the heat as residing in the coal, whether we are touching it or not, but it never occurs to us to think of the coal as in pain. The pain is in us—an entirely subjective feeling. Doubtless there is no more reason to think of heat, as it is appreciated by our senses, as a property of the coal, than pain, but that is the way in which we naturally think of it. That these two elements are really distinct is evident from the fact that the different senses furnish them in different proportions. Comparatively few sights, for instance, give any such sensuous pain to the eye as the sensation produced by getting a grain of sand under the lid, which gives us very little information in regard to the qualities of the offending substance. In fact, it is generally true that intensity of pleasurable or painful sensation is a hindrance to exact knowledge of its object. It is further evident from the fact that, in disease, one form of sensibility may be abolished while the other is retained. A person may be able to feel the slightest touch, and to recognise perfectly the size, shape, and texture of the objects he handles, and yet feel no pain when cut, struck, or burned, or he may have even heightened sensibility to painful impressions with loss of the power to recognise the sensible qualities of objects.

Now, although we are accustomed to distinguish between emotions and purely sensuous pleasures and pains, there are some points, at least, at which it is not easy to draw the line. My pleasure in the anticipation of a good dinner is undoubtedly an emotion. Is not my pleasure in eating it entitled to the same name, and does not the latter consist in the reality of the sensations which in the former case were enjoyed in imagination? Is not the enjoyment we feel in the smell of mignonette, the tone of a sweet voice, the color and form of the rainbow, emotion? Yet it consists largely, if not entirely, in the agreeableness of the sensations. Most people would probably think it strange to hear hunger and thirst spoken of as emotions



as existed in these cases would have produced no obvious effect on the emotions. fact that voluntary acts were performed by both these patients as well as by mpell's case, seems to me conclusive as to the existence of emotions of some in all of them.

It seems clear to me, from the foregoing considerations, that there are serious culties in the way of accepting Professor James's theory as an adequate explana- of all the phenomena of emotion. On the other hand, I think it contains an ortant truth, and that, by calling attention to it, he has rendered a real service sychology. In order to make it clear how far I agree with him, it will be neces- to consider just what feelings are to be classed together under the head of tion.

If we touch our fingers to a live coal, we are conscious of a sensation of heat, also of pain. If we take quinine into our mouths, it tastes bitter, and also dis- eable. So in regard to a very large proportion of our sensations, we recognise elements—one which has to do with the qualities of the object, and another isting of the pleasurable or painful way in which those qualities affect us. The ner may be called the objective element in sensation. We think of the heat as ling in the coal, whether we are touching it or not, but it never occurs to us to k of the coal as in pain. The pain is in us—an entirely subjective feeling. bitless there is no more reason to think of heat, as it is appreciated by our es, as a property of the coal, than pain, but that is the way in which we natur- think of it. That these two elements are really distinct is evident from the that the different senses furnish them in different proportions. Comparatively sights, for instance, give any such sensuous pain to the eye as the sensation pro- ed by getting a grain of sand under the lid, which gives us very little information regard to the qualities of the offending substance. In fact, it is generally true intensity of pleasurable or painful sensation is a hindrance to exact knowledge ts object. It is further evident from the fact that, in disease, one form of sensi ty may be abolished while the other is retained. A person may be able to feel slightest touch, and to recognise perfectly the size, shape, and texture of the ts he handles, and yet feel hen cut, struck, or burned, or he may have heightened sensibili loss of the power to recog- the sensible o

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I am inclined to think that it is proper to call such pleasures and pains as I have instanced above emotions, and if so, I see no reason for denying the name to any sensuous pleasures and pains. If Professor James's view is that all feeling is sensation, I should say that all feeling is emotion. Whether this view is correct or not, I do not see how Professor James can consistently refuse to accept it. On his theory, the emotions which he discusses must owe their pleasurable or painful quality to the pleasurable or painful nature of the sensations in which they consist. I can see no valid ground for saying that some such feelings are emotions and others are not. But the essence of emotion is pleasure or pain. Abstracting these qualities, it would be an indifferent emotion, which, I think all would agree, is a contradiction in terms. Possibly he might wish to limit the use of the term to those pleasurable and painful feelings, which arise not directly, but in a reflex way. He might say, for instance, that the disagreeableness to the ear of the creaking of an ungreased axle is not, but the shudder which it gives a sensitive person is, emotion. In that case, it must be admitted that a sneeze is emotion. His contention is that we have no other pleasures or pains than those of sensation. If this be true, a setting off of some sensations as emotions is, if not an arbitrary, a comparatively useless procedure.

My own view, then, is that the elements of sensation which I have spoken of as objective and subjective might, with equal propriety, be characterised respectively as intellectual and emotional, and that in this direction the theory under discussion, although true as far as it goes, does not go far enough.

However this may be, the admission or denial that these feelings are emotions does not necessarily affect the question whether or not this is the only origin of pleasure and pain. As has already been said, those feelings to which no one will deny the name of emotions are not usually, in adult human beings, at least, direct reactions on sensation. If it be true that the start we give at the unexpected slamming of a door is a sort of fright, it is a very rudimentary sort compared with that which one feels when the cry of fire is raised in a crowded theatre. "A burnt child dreads the fire." It is not the sight of the fire, but the thought of the burning, that arouses the emotion. When a man reads in the newspaper of the death of a friend, or a rise in the value of property in which he is interested, it is not the sight of the black marks on the white paper, but the beliefs which, through a long and intricate series of associations they call up, which move his feelings. If he could not read, he would see the same announcement without any emotion. The usual origin of the emotions *par excellence* is by way of association.

Suppose that I have taken a nauseous dose, and made a wry face over it. No one, I presume, would question that the disagreeableness lay in the unpleasant taste, and not in the distortion of the countenance. Now, suppose I have to repeat the dose, and my face takes on a similar expression at the anticipation to that which

it wore when I took it originally. How does this come about? If I can trust my own consciousness, it is because the vivid reproduction, in memory, of the unpleasant taste is itself unpleasant. I do not see how it can well be otherwise. Professor James says (p. 649) that "the first element of memory is the revival in the mind of an image or copy of the original event." How can I have a copy in my mind of a pain if it is not painful? Take away the painfulness of it and there would be nothing left. I might remember the circumstances under which it occurred, and judge from them that I must have suffered pain, but I could not, it seems to me, remember the pain itself. Whether that is possible or not, I feel sure that the fact, in my own case, is, that my memory of a pain resembles it in the same way that my memory of the circumstances in which it occurred resembles them. If this be the fact, what can be more natural than that it should excite the same sort of associated movements that were excited by the original sensation? I cannot make it seem any more credible, to return to the example mentioned above, that my repugnance to a repetition of the dose is due to my involuntary movements than that my discomfort in taking it originally was due to the similar movements that occurred then.

Suppose that a child who has eaten and enjoyed an orange is offered another. The sight of it calls up the recollection of the agreeable taste, and the expectation of a repetition of the pleasant experience excites expressions of pleasure. If the fruit is snatched away, the disappointment at the loss of the expected pleasure is distressing, and very probably may result in his weeping. I hardly think that any one who will consult his own consciousness will say that the reason he likes the taste of an orange is that it makes him laugh or smile to get it. He likes it because it tastes good, and is sorry to lose it for the same reason. The laughing or weeping is, I think, unquestionably the result of the pleasure or grief, not of the mere perception of an object in itself indifferent.

It is true that emotions of this sort do not always arise by way of personal association. Young children are apt to be afraid of strangers, of large animals, and of loud noises. I can remember being frightened at my first sight of a locomotive. Here we come upon the questions of inherited experience and natural selection, which can hardly be discussed in an article like this. The objects of which young children are instinctively afraid, as a rule, are either dangerous themselves, or more or less similar to dangerous objects. I see no more difficulty in supposing that mental pleasure and pain, on the sight of special objects, may be a matter of organisation than in the case of the analogous physical sensations.

My view of the matter, then, is that emotion in the sense in which the word is commonly used bears the same relation to perceptions or beliefs that feelings of physical pleasure or pain do to the objective or intellectual quality of sensations. I am inclined to think it proper to class all pleasurable and painful feelings together as emotions. If this view is correct, it would, of course, include those feelings to which Professor James would confine the term. I should not at all hesitate to admit that the emotional state of a person who trembles and turns pale with fear is

different from that of one who preserves his self-possession in the presence of a danger that he realises and dreads. I think it is true that the voluntary actions prompted by an emotion have some tendency to intensify it. But, so far as I can analyse my own feelings, the pleasures and pains of memory and imagination seem to me just as real as those of sensation, and not at all to be confounded with them. When I try to subtract all motor reactions and resulting sensations from the feeling of fear, for instance, there remains not merely the intellectual perception that the event dreaded is not desirable, but the perfectly distinct emotional consciousness that I do not desire it.

This view seems to be favored by the analogy between the relations of sensation to reflex movement on the one hand, and of perception to voluntary movement on the other, which will, I think, be found to be very complete. We have reflex acts which are useful, such as breathing, the beating of the heart, swallowing and coughing; and others, like groaning, weeping, and trembling, which seem to be useless. In like manner, emotions of hope or fear may give rise to voluntary acts calculated to enable the subject of the emotion to secure or avoid its object. If I burn my fingers, my hand is involuntarily snatched away. Such would not be the case if the burn caused no pain. If I see that the house is on fire, I try to escape, either by extinguishing the fire or by getting out of the house. It seems to me evident that I should not do so if the thought of being burned were not painful. Such emotions may also occasion useless acts, more or less similar to those mentioned above. A person who saw no way of escape from a burning house might tremble, weep, or groan from fear.

On the evolutionary hypothesis, it seems easy to understand how the reproduction, by memory or imagination, of certain feelings might bring about movements like those excited by the original feelings. Professor James would have us believe that this reproduction is always, in itself, indifferent, that is, merely intellectual; but that it is, nevertheless, capable of setting up the movements which, in the case of peripheral stimuli, are the results of pleasure and pain, and that the consciousness of these movements is, in such cases, the sole cause of the emotional condition. Such a reversal of relations seems to me highly improbable. Each one must decide for himself which view is more in accordance with the facts of his own consciousness.

W. L. Worcester.

PROFESSOR ERNST MACH'S TERM SENSATION.

SUPPLEMENTARY TO HIS CONTROVERSY WITH THE EDITOR.

The Monist, Vol. I, No. 3, contains a controversy between Prof. Ernst Mach and myself on some questions of psychophysics in which Professor Mach, having reference to an editorial article on "Feeling and Motion," regards sensations as the "elements of reality," "while motion," he says, "is a mere mental auxiliary, an

artificial expedient." "Physicists," we are told, "have accustomed us to regard the motions of atoms as more real than the green of trees. In the latter I see a (sensory) fact, in the former a *Gedankending*, a thing of thought."

In contradistinction to Professor Mach I maintained that our scientific terms, although abstract concepts and things of thought, or noumena, are after all descriptive of actual facts; they are symbols representing features of reality. Motions, i. e., that which is meant by the term motion, is a reality, and what the chemist calls atoms is a definite quality of certain facts of experience. Atoms are not things in themselves, as the name seems to suggest, but rather proportional relations conveniently so expressed as if they were ultimate units or concrete little bodies of a definite mass or weight. What atoms are, aside from representing the proportions in which elements combine, we do not know. We may define "atom" as the minimal weight in which an element enters into chemical combinations, but such atoms have never been an object of observation. For aught we know, they may as little be discrete bodies as a curve consists of discrete straight lines, which, as such, would be unobservable only because infinitesimally small. The infinitely small straight line into which a curve is analysed by mathematicians is a fiction, wisely devised for calculating the path of the curve. This fiction is as Professor Mach says, an artifice only, not a reality, or as I say, an allegoric expression to characterise not whole concrete realities, but certain features of reality in their abstractness.

Scientific terms are comparable to myths that contain deep religious truths. The fiction of the myth is only the vehicle of its meaning. The naked meaning in its abstract purity may be difficult to grasp. Thus our imagination steps in and completes the picture so as to render it concrete and easily thinkable.

Now, when several months ago I met Professor Mach at Prague, our conversation naturally touched upon the problems which had formed the subject of our discussion. Professor Mach assented to my speaking of scientific terms as abstracts. That, accordingly, must be considered as the point of agreement. But when I proposed that the term sensation also was according to my terminology an abstract term representing one feature of reality only and excluding other features, Professor Mach took exception to it, saying that he understands by sensation reality itself. Very well then, this is the difference; and this difference is after all a difference of terms only. I understand by sensation the psychical feature of the data of experience only, to the exclusion of what may be called its physical aspect. Sensation accordingly, as I use the term, is not the whole of the given reality but only one of its qualities. If, as Professor Mach uses the term, sensation is another name for reality, the main difference between our views appears to be removed.

P. CARUS.

BOOK REVIEWS.

VORLESUNGEN ÜBER DIE MENSCHEN- UND THIERSEELE. By *Wilhelm Wundt*. Zweite umgearbeitete Auflage. Hamburg and Leipsic: Leopold Voss. 1892.

The new edition of Wundt's *Menschen- und Thierseele* is one of the best existing general introductions to psychology. It preserves nearly the just mean between the purely introspective and abstract treatment and the substitution of physiology for psychology with which recent treatises have familiarised us. The author has completely rewritten the edition of 1863, which he regards as a youthful indiscretion *(Jugendsünde)*—retaining only such chapters as could be brought into harmony with his maturer views and with the developed science of psycho-physics that has taken the place of the *Zukunftsprogramm* of thirty years ago. He has wisely omitted all the superficial and diffuse chapters on comparative psychology and ethnology which cumbered the original work; has silently ignored the fantastic speculations as to the identity of electricity and nerve-force (one of the worst of the aforesaid youthful sins); and practically abandoned (perhaps as too esoteric for popular exposition) the elaborate reduction of sensations and perceptions to unconscious judgments and inferences.

The first thirteen or fourteen chapters offer a very clear and interesting résumé of the chief doctrines of the *Physiologische Psychologie* in regard to sensations generally, their measurements and qualities, Weber's and Fechner's laws, the special sensations of color, hearing, and the muscular sense, and the problem of space perception. Following the plan of the original work in these chapters, the author aims less at completeness of statement than to present clearly the distinctive doctrines of modern psychology. In the treatment of certain themes, e. g. Fechner's law, and the perception of space, he neglects, for the sake of clearness, qualifications of detail which the special student must look for in the larger work. The last sixteen chapters deal with the feelings, the will, consciousness, attention, association and apperception, conception, abnormal and animal psychology and instinct, concluding with two notable lectures on the "Freedom of the Will" and the "Immortality of the Soul." It is to these chapters that we must look for Wundt's general psychological and philosophical system. Profiting by recent criticisms he has here set forth his characteristic doctrines in so clear and definite a final statement that fur-

ther misconception of them is hardly permissible. The remainder of this notice will be devoted to what is perhaps the most interesting question thus suggested: Wundt's relation to the associationist psychology of Spencer on the one side, and to the younger German school of experimental psychologists on the other. Wundt ignores the Spencerian form of the associationist psychology, and the young psychologists do injustice to Wundt, neither side apparently condescending to read with attention the writings of the other. The debate, so far as it is not merely verbal, springs from two real differences of method: (1) Wundt in his psychological analysis habitually takes account of the problems of the theory of knowledge *(Erkenntniss-theorie)*, or ultimate metaphysics, which the young psychologists endeavor (not always with success) systematically to exclude. (2) Wundt, gifted with superior powers of introspection, is more aware than the young psychologists of the infinite complexity and subtlety of mental states. He prefers, therefore, to a schematic simplification of the phenomena a terminology and descriptive analysis that reflect in some measure their manifold diversity. And thus while Wundt finds the pure associationist psychology barren and tautologous, the young psychologists see in Wundt's complicated terminology only a shamfaced reversion to the discarded psychology of a substantial soul endowed with autonomous "faculties." But the analysis of our mental states which Wundt gives by means of this terminology is really only a subtler restatement of the analysis of Mill, Spencer, and Taine, to which the new psychology has not been able to add anything of moment. It is true that he proclaims the inadequacy of association, even when translated into the diagrams of a hypothetical cerebral anatomy, to "explain" fully our conscious active mental life. But in this he is at one with Spencer (ultimate scientific ideas), J. S. Mill (Examination of Hamilton), and Schopenhauer *(Epiphilosophie)*. It is gross injustice to stigmatise as an abandonment of the scientific attitude of mind this occasional passing recognition of the seeming ultimate inexplicability of things. In no single concrete instance can it be shown that Wundt now sacrifices the recognised methods and postulates of modern scientific investigation to the psychological hypostisations which his opponents detect in his terminology.

In confirmation of these statements I will give a brief summary of Wundt's doctrine of association and apperception with an occasional indication of its relation to the psychology of Spencer. Wundt distinguishes the totality of mental states which are perceived from the presentation at the focus of consciousness which is apperceived. In this way (substituting everywhere *dunkel bewusst* for *unbewusst*) he avoids the metaphysics of the unconscious, while getting the benefit of the entire analysis of its advocates. I do not think the ultimate difficulty can be evaded in this way, but will not stop to argue the point. A further advantage of this distinction is that it makes possible a dynamic treatment of mental states as "events" in place of the crude psychology that deals with the conditions of any mental state as so many ready-made parts externally dovetailed into the completed product. The active side of consciousness is taken into account from the outset. The mental state

at any moment is described by indicating the presentation which is then at the focus of consciousness (apperceived) and the accompanying faintly conscious presentations that qualify its tone and total effect. The given mental state is "explained" by tracing out the dynamic readjustments that brought this particular presentation to the focus, and grouped the faintly conscious presentations about it. Now the bringing of a presentation to the focus of conscious attention is the primitive psychical activity, the elementary act of will,* and since Wundt places this at the beginning he rejects all evolution of will or instinct from reflex action, and thus, it will be said, here at least puts himself in distinct opposition to advanced scientific thought Let us distinguish. So far as we are dealing with the developed minds we know, Wundt's distinction is merely the expression of an observed psychological fact. External volition does go back to internal voluntary attention and this to a focussing of consciousness for which apperception is as good a term as another. Such focussing of the attention is for us now the primary reaction of the "self" on its received impressions. Out of a given group of presentations I apperceive by preference one and you another, because at the time my "self," my mind, differs from yours. This self may be only a convenient short-hand expression for a passive product of external forces. The feeling of the reaction of the self may be an illusion, and its activity may be merely the mechanical action of a relatively coherent group of presentations when a new presentation is introduced among them, and the whole process may be explicable in terms of associations. But the feeling exists, and Wundt has described and analysed it better than any of his critics.

On the other hand, if the question is of the hypothetical origin of mind, we are at once brought face to face with an ultimate metaphysical problem which the new psychology impatiently ignores, which Spencer grudgingly acknowledges, but which Wundt and Kantians like Riehl find confronting them at every stage of their analysis. Conscious mind cannot conceive of its own origin, and therefore all psychological theories of development must postulate in some form the elements of consciousness and will. Nothing that I could add to the dialectics of this question would influence those who feel no difficulty here. They require a long course of Kantian criticism or its equivalent. At any rate it is not fair polemic to class a thinker as unscientific merely because he recognises this difficulty and gives it expression in his psychology, instead of contemptuously relegating it to metaphysics.

After thus laying the foundations in the doctrine of apperception for the psychology both of cognition and of the will, Wundt proceeds to restate the associationist analysis of Mill and Spencer in a more elaborate terminology but in substantial agreement with Spencer till he reaches the "concept," when the introduction of apperception gives rise to a seeming difference. Spencer distinguishes simultaneous from successive association as carefully as Wundt. What Wundt, after Herbart calls "complications," namely the joint reference to one object of a num-

* Cf. Ward, *Encyclopædia Britannica*, Vol. XX, p. 44.

ber of disparate presentations of sense, is clearly described by Spencer ("Principles of Psychology," §§ 315–355); and Wundt's "assimilations" do not differ appreciably from Spencer's "still less conscious" processes of "organic classification" ("Principles of Psychology," § 320). Into the metaphysics of the ultimate relations of contiguity and similarity as laws of association I cannot enter here. Similarity will always be recognised as ultimate by those who, like Spencer, approach the problem first from the psychical side, while a purely materialistic treatment in terms of nervous currents, such as we find in James, will endeavor to do away altogether with similarity, which simply cannot be expressed in terms of nerve-structure without reasoning in a circle. Wundt retains similarity but endeavors to coördinate it with contiguity. The problem is really identical with the final question of the relations of "mind" and "body," and cannot be profitably discussed apart from that question.

Coming now to the concept and the judgment, we find Wundt affirming that the different forms of simultaneous and successive association (as he has defined them) are not an exhaustive classification of mental processes—that they do not include the concept. Well, he is at liberty to define his own terms, and before we accuse him of hypostasising a new faculty to account for the concept, let us scrutinise his meaning. We shall find that he merely repeats, in a subtler terminology of his own, the analysis of Berkeley, Mill, Taine, Spencer, and Romanes. These writers treat the concept as a complicated associational group held together by the word. Now Wundt, while conceding the theoretic admissibility of this form of statement, holds that such groups present so many distinct characteristics that all delicacy of psychological discrimination is sacrificed by confounding them under one denomination with other associational complexes. He does not, like Professor James, bid introspective psychology "throw up the sponge" here, but wishes to carry his analysis into recesses which the instruments of the associationists are too clumsy to explore. In the interests of this analysis he limits the term association to combinations mediated by a limited number of elements. The (apperceived) concept, on the other hand, is the product of the reaction of the total mind. This distinction (whatever we may think of its absolute validity) expresses a finely observed psychological truth. The distinctive quality of a concept consists, Wundt says, "*in dem begleitenden Bewusstsein, dass die einzelne Vorstellung einen bloss stellvertretenden Werth besitze.*" This feeling he calls the *Begriffsgefühl*, meaning thereby exactly what Professor James means when he says that "the thoughts by which we know that we mean the same thing are apt to be very different indeed from each other," and that "a polyp would be a conceptual thinker if a feeling of 'Hollo! thingumbob again!' ever flitted through its mind." Only, instead of "throwing up the sponge," Wundt goes on to give a very interesting account of this feeling in its various degrees of clearness between the conceptual polyp and the conceiving man. Apperception is invoked only to name and emphasise the feeling of activity of the self that enters into the *Begriffsgefühl*, distinguishing it as a reaction of the total consciousness

from the relatively passive associations of what Romanes would call "recepts." Psychologists, however, will continue their fruitless debates on questions of terminology and will still imagine that Wundt is a belated reactionist. PAUL SHOREY.

BEITRÄGE ZUR EXPERIMENTELLEN PSYCHOLOGIE. By *Hugo Münsterberg*. Heft 4. Freiburg i. B. 1892.

Münsterberg's fourth *Heft* begins with studies in association. If *a* and *b* have been independently associated with *m*, can *a* call up *b* without the appearance in consciousness of *m*? The affirmative answer of common experience was confirmed by Scripture's experiments. Associating five Japanese symbols with two series of five German words, he found that a word of one series tended (without conscious recollection of the Japanese symbol) to revive the particular word in the other series that had been associated with the same symbol. Münsterberg, after repeating and varying the experiment in a number of fields, denies that any such relation can be observed. He may very well be right on the question of facts. It is *a priori* improbable that a transitory and arbitrary association of a meaningless symbol could modify appreciably the independent and accidental associative attractions of familiar words and presentations. The philosophic interpretation is another question. For our real knowledge it is a matter of indifference whether we fill out "missing links" with "*dunkel bewusst*," "*unbewusst*," or "cerebral processes that have no psychical correlates." And yet how much of contemporary psychologising is a logomachy raging around just this question.

Münsterberg's second series of experiments show clearly the part played by such missing links in perception. A word is called out just before a complicated picture is exhibited to the subject. He will usually perceive first in the picture some object naturally associated with the word, even though the word has aroused no conscious associations.

Similarly (III) a hastily seen misprinted word will be interpreted variously according to the associations of another word called out to the subject in advance.

Another series of experiments has for result that even the most commonly associated word-couples, as table and chair, have no fixed, unconditional associative attraction for each other in the same or in different minds, but that the unit of attraction is the "associative constellation." This is only common sense, and artificial experiments will never reveal anything in this field that we cannot learn quite as well in the class room. "Table" will suggest "logarithm" if the boy is fresh from the class in trigonometry.

"The difference between men is in their principle of association" said Emerson long ago. Münsterberg, who has in his archives records of fifty thousand experiments in verbal associations, presents a table of the comparative frequency with which substantives are associated with superior (more general) or inferior class names, with adjectives or with verbs to which they stand in the relation of subject or of object. His chief result is that minds which associate a noun with its higher

class name *(Ueberordner)* think of it as the subject of a verb and do not associate it with an adjective. The *Unterordner* thinks of the noun as object of a verb and associates it with an adjective. The adjective, then, is not the higher class to which the substantive belongs, but a limitation of the substantive. The French, if they please, may use this conclusion to refute Spencer's contention that "white horse" is a more natural order than *cheval blanc*.

The first topic in "memory studies" is the persistence in the psycho-physical mechanism of the disposition to an acquired automatic movement, even after the memory of the nerve has been seemingly displaced by the habit of its contrary. The experiments were trivial, such as shifting the position of an inkstand from right to left in alternate months, or wearing a watch alternately in the right or left fob. The result, a progressive diminution of the mistakes made after every change, may plausibly be explained by the stimulated attention and consequent care of the experimenter. The second topic treats of the effect of a time interval on the exactness of our memory of sensations of movement in eyes and limbs. The section on "chain reactions" is a methodological study of the various applications of this experimental method. "The influence of nervous stimulants on psychic activities" is rather interesting reading, but yields no important results. Alcohol depresses, tea and coffee heighten the powers of memory and perception for an hour or two after absorption. But the harmful effect of the alcohol sometimes passes away after the first hour. *Grössenschätzung* is a study of our estimates of distances on a surface, made by passing the hand over it at arm's length, at half arm's length, etc. From experiments as to the estimate of absolute tone-distances (as distinguished from musical intervals) Münsterberg concludes that pure measurements are not possible with three tones only. Experiments with four tones do not, he says, confirm the law that distances corresponding to equal differences of vibration are felt as equal.

Physiologists have assumed that the symmetrical movement of the limbs as in swimming or rowing is the natural one; and the alternating or independent movements, as in walking or writing, are an acquisition involving inhibitions of the natural innervations. "Even in adult life," says Professor James, "there is an instinctive tendency to revert to the bilateral movements of childhood." Professor Münsterberg was led to doubt this view by observing the unsymmetrical motions of a baby in a warm bath, and experiment has confirmed his scepticism. Complicated joint motions of both hands (tracing circles or other geometrical figures on a surface) do not exhibit any tendency, when the attention is distracted, to assume the symmetrical form. They rather tend to compensate each other in such a way as to preserve equilibrium with the minimum strain on the other muscles of the body, and this law leads as often to alternating as to symmetrical movements of the arms or legs. The case is different of course with the muscles of the trunk, and may be different in birds, as it would in us if we spent our lives in swimming or rowing.

A new method of attacking the problem of localisation is to observe the effect of altering the circulation in different parts of the brain. Tentative experiments on

one subject seem to show that verbal associations are readiest when the victim lies on his left side, which is a happy coincidence with the localisation of the speech centres in the left frontal convolutions. If these statistics can be trusted, it is inadvisable to undertake hard mental labor with the head hanging back over the edge of a chair!

In the last chapter, certain simple experiments in our estimates of voluntary movements in varying conditions of mind and body are made the basis of a far-reaching theory of pleasure, pain, and judgment, the elements of which can be found in Aristotle, Herbert Spencer, and James. Münsterberg found by repeated experiments that the accuracy of attempted reproduction of a fixed and familiar amount of centripetal or centrifugal movement of finger and thumb along a rod perpendicular to his waistcoat varied with his condition of fatigue, pleasure, or pain. In a pleasurable state of consciousness the centrifugal movement was exaggerated while the centripetal fell short. In pain the reverse relation obtained. Hence he infers a connection between pain and muscular flexion and pleasure and muscular extension, or rather, he distinguishes the mere sensation of pain *(Schmerz)* and pleasure *(Lust)* which may depend on integrations and disintegrations in the nerve-tissue, from the accompanying feelings of agreeableness *(Wollust)* or disagreeableness *(Unlust)* which are due to sensations aroused at the centres by movements of flexion and extension throughout the body. He thus attaches his special theory of pleasure and pain to Lange's and James's theory of the identity of the emotions with their bodily concomitants—though he protests against the metaphysical implications of the doctrine. The origin of the existing coördination of muscular flexions and extensions with pleasure and pain, he explains teleologically on the principles of the Spencerian psychology of evolution. He then proceeds, after Sigwart and Brentano, to revive the old idea of Aristotle (whom he does not mention) that the judgment (affirmative or negative) is rather the assumption of an attitude toward a presentation *(Stellungsnehmende Akte)* than a mere conjunction of presentations. The affirmative judgment is a faint incipient represented movement of the self towards a suggested conjunction of presentations. The negative judgment is a similar movement in the opposite direction. Ontogenetically these inchoate movements are later than the movements of acceptance or rejection called forth by a painful or pleasurable stimulus, and must therefore be treated as derivative phenomena. But the Kantians may derive some comfort from Münsterberg's final assurance that he too believes that "*Erkenntnisstheoretisch das Urtheil primär ist.*" PAUL SHOREY.

THE SPIRIT OF MODERN PHILOSOPHY. By *Josiah Royce*, Ph. D. Boston and New York: Houghton, Mifflin & Co.

We are told by Professor Royce in the preface to this book, that we are indebted for it to the lady friend to whom it is gracefully dedicated, who asked him "for some account of the more significant spiritual possessions of a few prominent modern thinkers," to be related "in comparatively brief and untechnical fashion."

The larger portion of the work is taken up with that subject, exhibiting the general growth of modern philosophical thought beginning with Spinozism, and terminating with Monism as the outcome of the doctrine of Evolution. The author's purpose is constructive, however, as well as expository. He has his own philosophical creed, suggested by what he knows of the progress and outcome of modern thought, and the second portion of the work is the expression of his thoughts on the world-conception which he regards as embodying the true spirit of modern philosophy. Professor Royce justly lays stress on the fact that the theory of evolution is the product of a genuine and continuous growth. He dwells particularly, moreover, on the distinction between the *epistemological* sense of idealism, which "involves a theory of the nature of our human knowledge," and its *metaphysical* sense, in which it is "a theory as to the nature of the real world, however we may come to know that nature." It is in accord with the latter sense that Fichte, Schelling, Hegel, and their allies, as believing matter to be an expression of the world-spirit, are referred to as the idealistic school; and it is in the metaphysical and not the epistemological sense that the term idealism has been used since Hegel. The opposite of a metaphysical idealist is "one who maintains the ultimate existence of wholly un-"spiritual realities at the basis of experience and as the genuine truth of the "world—such unspiritual realities for instance as an absolute 'Unknowable,' or, "again, as what Hobbes meant by 'Body.'" This is not, however, the view of the author, who thinks that the metaphysical idealist alone is in possession of a successful solution for the epistemological problem.

Professor Royce divides modern philosophy into three great periods, of which the first was one of pure and simple naturalism. The supernatural had then only a secondary interest, and thought was governed by three ideas—"that nature is a "mechanism, that human reason is competent to grasp the truth of nature, and "that, since nature's truth is essentially mathematical, geometry is the model science, "whose precision and necessity philosophy, too, must imitate." During the second period of modern philosophy there was a gradual change of thought objectivity. Reason was still the instrument, but it was employed on the mind itself. It came to be recognised that if man is part of nature's mechanism, he is a knowing mechanism. The age was, however, more than one of self-analysis. Rousseau introduced a sentimental tendency from which came "a revival of passion, of poetry, and of enthusiasm, whose influence we shall never outgrow." To it is traceable the French Revolution which overthrew all the mechanical restraints of civilisation, and "demonstrated afresh to the world's outer sense the central importance of passion in the whole life of humanity."

The period of modern philosophy, which still continues, began with the publication of Kant's "Critique of Pure Reason," the essential doctrine of which is that man's nature is the real creator of man's world, that visible nature is the expression of the human spirit, the inner structure of which is therefore the deepest truth for us. This idea is "as old as deeper spiritual faith itself," and yet it is the very

soul of all our modern life because it is "the essentially humane view of reality." For fifty years Kant's ideas ruled philosophic thought, and then, through the progress of science, the doctrine of evolution received formulation and confirmation and "external nature has once more gained for us an imposing authority which makes us in many ways sympathise afresh with the pure naturalism of the seventeenth century." We are compelled to omit any account of the author's study of the philosophies of Spinoza, Locke, and Berkeley, or the philosophic systems of Kant and his successors of the German School of Idealists. Nor can we say anything as to the doctrine of Evolution, which Professor Royce rightly regards as having had its rise long before Darwin or Herbert Spencer. Before proceeding to state his own views, the author takes a cursory glance at modern empirical monism which he affirms to be rather a suggestion than a philosophy. It is not surprising, therefore, that he is not content with it although he makes use of its ideas.

Let us now see what are the "Suggestions" which Professor Royce offers as his contribution towards the formation of a world-conception. These occupy the last four chapters of the work, which are supplemented by a general summary in the appendix to the book. For the sake of conciseness we will make use of this summary, according to which there are two phases of idealistic doctrine, the Analytic Idealism of Berkeley and the Synthetic Idealism of Kant and his successors. The former shows that if the world is to be knowable at all, it must be, in its deepest nature, a world of ideas, that is, it exists "only in so far as beings with minds actually *know it to be*." The objection that nobody can *know* any reality beyond his own self, is met by the synthetic phase of idealism which shows us that "there is but one self in the world, the logos or world-mind. The *finite* self knows truth beyond its own limitations, just because it is an organic part of the complete Self." What are the demands of idealism as thus stated? They have relation, first, to the interpretation of the facts of experience, which must be in terms of the doctrine of the world-mind, and, secondly, to experience itself, on which we depend "for the revelation of that truth which, for us finite beings, must remain a fast 'outer' truth, just because it is the content of other mind than our own bits of selfhood, and is universally true for all intelligences." The philosophy of experience having to do with facts and with the interpretation of facts, it is necessary to distinguish between what is really "outer" and what is "inner" about our finite experience. The former embraces the world of facts, and a fact is something which must be describable in some sort of universal terms. The principle of ordinary realism, "that you must not be sentimental or otherwise emotional in your account of the truth of things, but rather *exact in your descriptions of what things are*," has a thoroughly idealistic justification. Not appreciation, but description gives us outer truth, and this is the characteristic presupposition of all natural science, which is concerned with the universal aspects of things, as opposed to momentary and transient aspects. That presupposition involves the assumption that the world is *essentially describable*. But as only the well-knit, the orderly, that which conforms to law, can be described

science assumes the universality and rigidity of the laws of nature. It assumes further, since the most exact descriptions are possible only in the case of processes in Space and Time, of a mechanical type, that everything including man himself, is a part of nature's mechanism. A closer analysis, however, shows that, as one can only describe what has been first appreciated, there must be universal types of appreciation, and therefore, that "Ideals must be deeper than Mechanism, so that, in order to be relatively describable, nature must embody purposes, and so be possessed of worth." The author's conclusion is that the natural order is also a moral order, and that therefore "the world of absolute self must appear to us as having "two aspects, one a temporal, the other an eternal aspect, one of law and one of "worth. Man then turns out to be at once a part of nature's mechanism, and a "part of the moral order; at once temporally determined and morally free."

The final lecture presents the author's views as to the solution of the problem of evil. Professor Royce believes that all evil is part of a good order, and hence he agrees with Hegel, who declared that life, however good, will always be restless, longing, suffering, and who gloried in the paradox as the very essence of spirituality; rather than with Schopenhauer, whose recognition, in another light, of the universality of the same truth led him to abandon all hope in life. The justification of the existence of an evil impulse comes just at the instant when it is hated and condemned. Thus "condemning and conquering the evil will, makes it part of a good will"; as pain and suffering have their compensation in their chastening effect on the spirit. But to the enlightened soul it is not so much the painfulness as "the blind irrationality of fortune that seems to drive God out of our thoughts when we look at our world." It is the capriciousness of life, arising from human stupidity, that really makes it seem like an evil dream. What is the explanation of this caprice given by the author? It is to be found in the creed of his idealism, "This world is the world of the Logos." It is "the suffering God, who is just our own true self, who actually and in our flesh bears the sins of the world, and whose natural body is pierced by the capricious wounds that hateful fools inflict upon him." And as our defeats are his, so his triumph and his eternal peace are ours also.

Prof. Royce in making "only one more effort to define a 'double-aspect' theory of the relations of the physical and the moral and æsthetic worlds," affirms that our philosophic insight teaches us that the world of matter in motion is simply an external aspect of the appreciable world, that is, of the world of the Logos. Of this, it is such an aspect "as can be expressed by finite consciousness in terms of the space and time forms, and of the categories of empirical science. . . . Consequently all its laws, all its necessity, its causation, its uniformity, belong, not to its inner nature as such, but to the external show of this nature." That which actually appears to us is matter in motion, which furnishes the fact of the double aspect, the inner intelligibility of which fact is problematical to us, but not so for the Logos, who is our true Self, and who "completes the insight that for us is so fragmentary." This true Self, the Logos, is the only Self, and with it the deeper

self of man is identical. That this deeper self is "the self that knows in unity all truth," is declared to be no hypothesis, and therefore the existence of the Infinite Self is perfectly sure. This Self "infinitely and reflectively transcends our consciousness, and therefore, since it includes us, it is at the very least a person, and more definitely conscious than we are; for what it possesses is self-reflecting knowledge." Finally, the true world, that is the world of appreciation, is the system of the thoughts of the Logos, whose unity we know just so far as we ourselves consciously and rationally enter into it and form part of it. Therefore "in so far as we have inner unity of thinking, in so far as we commune with our fellows, and in so far as we rightly see significance in the outer universe, we are in and of the world of appreciation that embodies the thought of the Logos."

Ingenious as this theory is, and notwithstanding the elements of truth it possesses, we cannot accept it as conclusive. Its weakness is revealed in the last line of the paragraph just quoted. If only the world of appreciation embodies the thought of the Logos, what becomes of the world of fact? The latter is said to be the outer aspect of the former, a notion which is apparently derived from the association with man of body and mind. But the existence of mind, which we must understand by the term Logos, in nature, although declared by Professor Royce to be the only thing certain, is a mere inference, and even if the analogy of the human organism justifies such an inference; it would require that if priority has to be given to mind or matter in the universe it must be allowed to the latter. At birth a human being has no mind, properly so-called, since it is the result of the activity after birth of the organism, through the agency of the brain. It is true that the human body possesses from the first the elements of the mind, or rather of the feeling which thus exhibits itself; or, better still, the organic structure of which feeling is the general function. The utmost that can be properly asserted of the universe, therefore, is that it possesses a certain organic arrangement of its parts, and therewith such a condition of feeling, or, what in this relation would be a better term, sensitiveness, as is required by its organic character. In relation to such a state of things the terms thought, consciousness, reflection, have no meaning so far as we can judge. That organic aspect of the universe, moreover, leaves no room for duality. Just as the human organism constitutes a perfect unity, although it is made up of various organs and exhibits the properties attributed to both mind and matter, so must the universe be such a perfect unity whatever its nature and attributes. The human organism may, however, be strictly described as matter under organic conditions, a description which is equally applicable to the universe, without determining what those conditions are. Professor Royce objects to the Unknowable of Herbert Spencer, but there is very little practical difference between it and his own true Self, which, as the Absolute, is unknowable, although he is known in the inner self of man, as Spencer's Unknowable is known in the human consciousness. Both Absolute and Unknowable are, however, merely names for Organic Nature, which is seen in all things visible and is known by all her operations.

These are governed by the laws of her very existence, and it is the uniformity of which those laws are the expression which constitutes the moral law of the universe, the breach of whose eternal order, whether this is established in the world of matter or in the human mind, must be attended with consequences that are designated by man as evil. We find only a world of description, which is nevertheless one of moral order.

Widely as we disagree on the grounds stated with the conclusions of Professor Royce's work, it is undoubtedly a valuable contribution to the discussion of the world-problem. Its description of the characteristics of the philosophy of Kant and of the German idealists is clear, though not intended to do more than exhibit the spirit of their teaching, and it is written in a style which renders it easy reading. It is a pity, therefore, that it is disfigured with such colloquialisms as *you'll*, *isn't*, *can't*, *don't*, words which neither sound well, nor look well in print. Ω.

Die Aristotelische Auffassung vom Verhältnisse Gottes zur Welt und zum Menschen. By *Dr. Eugen Rolfes*. Berlin: Mayer & Müller. 1892.

This book is a scholastic "survival." The author believes that Zeller's interpretation of Aristotle is wrong, and in five formal theses he endeavors to prove *secundum artem* that the philosopher was a theist who taught the creation of the world from nothing, and the immortality of the soul. In the defence of his theses he manifests some ingenuity and industry, but no criticism. The work has no scientific significance. P. S.

Max Stirner und Friedrich Nietzsche. Erscheinungen des modernen Geistes und das Wesen des Menschen. By *Robert Schellwien*. Leipsic: C. E. M. Pfeffer, 1892. Price 2 m 60 pf.

Individualism is the spirit of the age, and among all the champions of individualism the most original, the most consistent, the boldest, are perhaps Max Stirner and Friedrich Nietzsche. Robert Schellwien, in sketching their views in great outlines, partly admires these courageous thinkers who dare to draw the consequences of their principles to the very last even though they will appear absurd to the world, partly censures the rashness with which they arrive at, and the superciliousness with which they sometimes state, their opinions. Upon the whole the author succeeds in impressing the reader that there is in these two peculiar geni uses a gigantic strength, and that their views of truth, morality, and justice deserve a greater attention than they have received. The reviewer is no admirer of either Stirner or Nietzsche; he believes nevertheless that a careful analysis of their erratic minds and lives will be very instructive. It will be first of pathological and then even of more than pathological interest. The actual objective value of the ideals truth, morality, and justice, will be best illustrated by showing all the consequences of a consistent individualism. We hope that this pamphlet will grow into a more comprehensive work; and in that case we should advise the author to add short biographies of his heroes. κρς.

THE SOURCES AND DEVELOPMENT OF KANT'S TELEOLOGY. By *James Hayden Tufts*. Chicago: University Press. 1892.

This little tract is an inaugural dissertation presented by Mr. Tufts to the University of Freiburg for the attainment of the doctorate of philosophy. It is written in English. Mr. Tuft's dissertation is wholly historical. He simply seeks to expound Kant's true views. In this respect the work bears the marks of much research and of a thorough exploitation of Kant's works. Mr. Tuft's concluding words are that "with every new discovery of science, every advance in the ideals of art and of the conduct of life, every development in religious faiths, comes anew the task for philosophy to criticise, and through criticism to make a fresh attempt to interpret from the unity of reason the manifold of life." μκρκ.

DISTINCTION AND THE CRITICISM OF BELIEFS. By *Alfred Sidgwick*. London: Longmans, Green, & Co. 1892.

This work might be described as an inquiry into the conflict between philosophy and common sense, and its central idea as the continuity of nature. What bearing this idea has on the inquiry is shown by the statement, that the distinction between philosophy and common sense is only one of degree. And yet, regarded as methods, or attempts to follow ideals, they may be sharply contrasted. This implies the existence of distinctions, and hence arises the question how far distinction is consistent with continuity in nature. The recognition of such a continuity requires the admission of the unreality of distinctness, but this fact is not inconsistent with the use of rough distinctions, which give rise to what the author terms effective ambiguity. Here we have the field of the operation of common sense, which exhibits itself as tact in the use of rough distinctions, while, on the other hand, philosophy may be said to be concerned with the continuity which, from a superficial glance, might be supposed to stand in opposition to distinction.

The ultimate result which Mr. Sidgwick has in view is the reconciliation of philosophy and common sense, although it is incidental to his main purpose, which is the discussion of the best way of dealing with ambiguity, that is, of using rough distinctions. The improvement suggested is the substitution of "reasoned discrimination" for "haphazard tact," and it is based on the doctrine that "the validity of all distinctions is relative to the purpose for which they are used at the time." This cannot mean that distinction is merely relative, as it is said that there is no distinction which is quite safe against being broken down. The implication is that a safe distinction is possible, although difficult to find, and consistently with that view, the doctrine has the double aim of repressing excessive belief in distinctions which are, at least for the moment, invalid, and, on the other hand, of "enabling us to justify for a passing purpose, distinctions which are faulty on the whole." The justification here arises from the use, and not from the distinctions themselves, although it is evident there must be some basis for them, or they would be invalid. The element of truth is derived from the continuity of nature, with which philosophy is

concerned, and hence the improvement in the method of common sense is to be effected through its regulation by the method of philosophy.

The justice of this view may be tested by its consequences, which are stated by the author in reviewing the chief incidental aims of his book, as being those which have to do with controversy, the faults of language, and the conflict between the rival ideals, faith and doubt. "Philosophy," we are told, "is doubt, just as science is knowledge," (a description which like many other things in this book we cannot endorse,) and the true centre of philosophical interest in regard to rival ideals is "to harmonise the dispute by seeking how to limit each ideal by its opposite." This is the aim of all real philosophy, which recognises that every ideal has an element of truth. Philosophy is thus explanation, and Mr. Sidgwick avers one of the great dividing forces in philosophy has always been "the rivalry between two opposite methods of general explanation—that which explains small things by great ones, the part by the whole, the many by the one (e. g. all earthly facts as related to their one cause and substance); and that which explains great things by small ones, the whole by its parts, the one by the many (e. g. the system of nature as a 'concouse of atoms')." Thus regarded, the distinction between philosophy and common sense is simply one of method; and it may be said to consist in the use by the former of rational doubt based on scientific knowledge, as distinguished from the belief founded on popular wisdom which distinguishes the latter. Both alike, however, are the fruit of observation, pushed further, nevertheless, in the one case than in the other, which is practically the view expressed by the author.

In considering the nature of philosophy, we have given the gist of Mr. Sidgwick's reflections on controversy, which is treated as the opposition of ideals. This conflict is kept alive chiefly by doubt as to how abstract notions should be applied in concrete cases, and largely owing to "the absence of that kind of sharp distinction which is applicable, not only to the notions themselves, but to the actual facts to which they pretend to refer." This view is ably enforced, as well as the necessity of applying to the conflict between ideals the rule laid down as to the purposive validity of distinctions. The operation of this rule would be attended with concession instead of assumption, there being, however, the admission, which is equivalent to an assumption, that neither side of any ideal dispute is devoid of some truth as as well as some error. This is really required, if not by the continuity of nature, yet by continuity in our interpretation of nature. This is continuity in thought, and hence arises the difficulties connected with language which it is one of the author's incidental aims to point out. He supposes that language acts as a drag on the progress of knowledge, owing to the *clumsiness* of words arising from the fact that "things spoken of are always more full of change and movement than the words we can use in speaking of them."

Mr. Sidgwick insists upon continuity, yet change itself may be evidence of at least partial discontinuity. Our author remarks, in an appendix note on the continuity of nature, that every change, as such, is a *saltus*, however small it may be,

and that the same is true of any gap between the two extremes of nature and the intermediate region. That such an intermediate region exists, is required by the continuity of nature, which again is evidence of change, on the principle that every chain is made up of a series of links. But as in the chain there is no real gap between the links, so there is no actual discontinuity consequent on change in nature. The two extremes may be regarded as prolongations of the intermediate region, and the changes to which such prolongation is due may so occur that there may be discontinuity between certain parts, as between the fibres of which a hempen rope is made, and yet there be a perfectly continuous whole. We have an example of such a discontinuous *continuum* in a beam of ordinary light, which presents not the slightest gap, and which yet is made up of numberless undulations in different ratios representing the six spectrum colors, each of which is, moreover, spread throughout the whole of the beam. Here we see that continuity is quite consistent with distinction. The latter may be regarded as discrimination of the various phases of the former, and the distinction remains valid or otherwise according to the accuracy of the discrimination or not. But constant change of distinction is required by progress in knowledge which may be regarded as a thought representation, by discontinuous steps, of the continuity of nature.

As to the conflict between faith and doubt, the author considers the function of scepticism as the search for grounds of belief, and thus doubt is said to be "rather a friend than an enemy to those who remember that there is still some truth, on any subject, for fallible men to learn," as well as to those who are more interested in the discovery of truth than in supporting their own beliefs. Ω.

VORLESUNGEN ÜBER GEOMETRIE, unter besonderer Benutzung der Vorträge von Alfred Clebsch. By *Dr. Ferdinand Lindemann*. Leipsic: B. G. Teubner. 1891.

This first part of the second volume of Alfred Clebsch's Lectures has been arranged and treated by Professor Lindemann in the same way as the first, except perhaps that the editor has extended his independent investigations rather further than before, owing mainly to the fact that he had in addition to his own notes when attending Professor Clebsch's lectures in 1871–1872, only five folio pages of the late master's manuscript at his disposal. The present volume is divided into three parts. I. The Point, Plane, and Straight Line. II. Surfaces of the Second Order and of the Second Class. III. Fundamental Conceptions of Projective and Metrical Geometry. Historical notices and references are added in foot-notes. Considering the prominence of the editor as a mathematician, it would be a presumption on our part to praise his work. κρς.

AN INTRODUCTION TO GENERAL LOGIC. By *E. E. Constance Jones*. London: Longmans, Green, & Co. 1892.

This work is another witness of the great interest now being taken in all that pertains to the methods of knowledge.

Miss Jones, the author, is lecturer on logic at Girton College, Cambridge. During an experience of several years in teaching, certain difficulties have very forcibly pressed themselves upon her attention. She hopes by her book to aid in removing these difficulties.

It is certainly a good augury for women when their intellectual representatives begin to show the disposition to turn towards the "dry light." Logic and mathematics are "dry" to be sure; that is, they are very apt to be *found* dry, very dry, by beginners, and always by those who lack that real intellectual robustness which is alone fit to meddle with fundamental problems. Hence these sober and severe disciplines find little favor among those who seek merely for "showy" attainments, those to whom whatever is "uninteresting" is intolerable, and those who regard obscurity as inseparable from profundity. When then we find scholarly women manifesting a real relish for this "dry light," it gives promise of a coming day when the intellectual appetite will rise above the level of mere entertainment, the level of the play-house and the circus, and take kindly, and perhaps zealously, to real edification.

Miss Jones makes but very modest claims on behalf of her treatise. She has not undertaken to innovate to any great extent upon the regular scheme. If in her changes there is that which might especially provoke criticism, it is perhaps in the nomenclature which she adopts. The traditional logic forms a system which has its own proper merits and defects. It is of great historical interest, and its regular terminology is almost indispensable for the proper illustration of its doctrines.

We think also that the author fails to state the case in all its amplitude, when, she lays it down as one of the most absolute and ultimate of all logical principles that the self-evident ought to be believed. The truth is, as we conceive it, that the self-evident is sure to be believed, and that in the face of any proposition that truly bears its own justification along with it, any doctrine of logic is either useless or impertinent. *ρσλ.*

HYPNOTISMUS UND SUGGESTION. By *W. Wundt.* Leipsic: Wilhelm Engelmann. 1892.

A Greek student translates *κλεινός* 'small'; "You are thinking of the German *klein*," says the teacher quickly. Another renders *ἡμεῖς γὰρ ἀγνοί*, 'we are lambs,' misled by a chance cross association with the Latin *agni*. Every careful self-observer knows that there is no combination of memories, images, and resultant incipient acts too absurd for some moments of confusion and mental fatigue. We account for such confusions of thought by citing parallel cases and adding generally that normal associations are liable to disintegration and abnormal recombination in fatigued or excited conditions of the brain. If we seek a causal scientific explanation, two methods are open to us: (1) we may attempt to map out in detail and describe for all similar cases the pathways of association, or (2) we may endeavor to define their physiological conditions and accompaniments in the nervous system.

The first leads us at once into the metaphysics of the unconscious. The second method, when we attempt to pass from a general to a specific correspondence, leads to a hypothetical restatement of the observed psychological facts in terms of the latest cerebral anatomy and physiology. Now all serious scientific thinkers are fast coming to the conclusion (on which Wundt's book is based) that the phenomena of dreams and of hypnotism are to be explained by the general laws of association as revealed especially in the confused and obstructed associations of the normal state. The critical and destructive part of Wundt's sensible and timely work has two aims: (1) to discriminate the attested phenomena of hypnotism from the alleged phenomena of thought-transference, telepathy, and "possession" on which no serious student will waste his words; and (2) to point out the confusions of thought in current explanations of hypnotic phenomena, which either confine themselves to restatements of the observed facts in terms of a hypothetical anatomy, or at any rate in Wundt's opinion base their physiological hypotheses on an inadequate psychological analysis. His own constructive work is an attempt to supply the missing analysis and accompany it with the most plausible physiological theory that our imperfect science allows. Dreams and the illusions of the hypnotic subject are doubtless explicable generally as derangements of the associative machinery. But they are specific forms of abnormal association, the special characteristics of which we wish to define. Suggestion, Wundt says (with James), is association accompanied by a "limitation of consciousness to the images aroused by the association." The scientific problem is: *Wie entsteht die Einengung des Bewusstseins?* This narrowing of consciousness manifests itself in a diminished sensibility to all impressions outside of the suggestions. Dreams show the same features, accidental impressions of sense or changes in the nutritive processes here taking the place of direct suggestions from without. But in sleep and dreams the limitation of consciousness is conditioned by general fatigue of the nervous system. In the hypnotic state it results not from fatigue, but from neuro-dynamic and vaso-motor changes in the distribution of tensions in the brain. Hence the superior intensity and vividness of the presentations that are allowed to develop themselves. This altered equilibrium of the forces of the brain is brought about by the suggestions of the operator, which are generally guided by him to a more or less definite end. The resulting derangements of normal associations are consequently less lawless than is the case in dreams. On these principles Wundt explains the chief facts of hypnotism as follows: Automatic obedience to the commands of the operator results simply from the fact that every idea tends to realise itself in action, is an incipient act; and in the narrowed consciousness of the hypnotic subject the idea suggested by the operator finds no competitors in the struggle for existence as a reality. This explanation (which is really as old as Spinoza) accounts also for positive hallucinations—there are no reductors, as Taine would say. Negative hallucinations (the non-existence of an existing door) may be explained sometimes by a contradictory positive hallucination (as of a curtain covering the door) more often in the same way as hypnotic analgesia

by the familiar analogy of our insensibility to the toothache when the attention is elsewhere strongly engaged. This is favored by the generally diminished sensibility of the hypnotic subject. Post-hypnotic suggestions are associations depending on partial memories, such as we have in the normal state when we merely recall an image or an object without time-and-circumstance localisation. The subject who is to execute a post-hypnotic suggestion at 7 o'clock is reminded by the striking of the clock of an image of a thing to be done which the original command of the operator associated with the stroke of seven. All else is forgotten. When the time limit is not thus definitely marked, the process must be analogous to that whereby some persons are able to waken at a predetermined hour in the morning. A latent association is aroused into full activity by naturally recurring conditions of internal physiological processes or external surroundings. Courtesy or prudence are perhaps all that prevent the best explanation of certain extreme cases being the old one: "the boy lied." Wundt rejects the claim that suggestion is the experimental method in psychology *par excellence*, for the very sufficient reason that the phenomena experimented with are only very partially in the control of the operator and are furthermore mainly pathological. He is far from disputing the practical efficacy of hypnotic therapeutics in functional disorders, but he regards the hypnotic sleep as a dangerous remedy, the employment of which should be limited to trained practitioners. The subjection of the hypnotic subject to the will of the hypnotiser is *a priori* an immoral relation to obtain between man and man unless justified by superior medical necessities, but, quite apart from *a priori* ethics, indiscriminate hypnotisation is to be discouraged as a direct cause of nervous degeneration. The book closes as it began with a dignified but severe reprobation of those thinkers who in the interests of occultism magnify the psychological significance of hypnotism and disseminate superstition in the name of science. PAUL SHOREY.

DER HYPNOTISMUS IN GEMEINFASSLICHER DARSTELLUNG. By *Dr. Hans Schmidkunz*. Stuttgart: A. Zimmer (E. Mohrmann). 1892.

This book (266 pp.) is a popular compendium of hypnotism. The author, beginning (I) with the hypnosis of common life, goes over the whole field as follows: (II) the phenomena of hypnosis, (III) its application, (IV) the "beyond" of hypnotism, (V) the conceptions of hypnotism, and (VI) its dangers. The seventh and last chapter is a short history of the subject.

Dr. Schmidkunz, Docent of philosophy at the University of Munich, is one of the few who believe that there is a "beyond" in hypnotism. He says on p. 65: "A hypnotised person was led through a room while sleeping. The experimenter made a few passes over his head and then violently whirled his arm around in a vertical direction before his subject. When the subject approached the marked place, he recoiled from it crying with pain." Our author asks, "what is this magnetic wall to be regarded as? As a charm, as an obstacle of occult power, from which the body recoils as from a wall of stone? If not, was it the subject's soul that

recoiled? Was it the hypnotised person's belief which created the wall?" etc. The two interpretations, the one attributing the effect to a magnetic power, the other to suggestion are typical. The former is bolder: he goes "beyond" hypnotism.

Our author is one of those who go beyond hypnotism, and is not satisfied with the theory that suggestion explains all. We may add that he regards telepathy as a sufficiently established fact. Telepathy finds little support among scientists in Germany, and Dr. Schmidkunz complains, in a circular letter to "Professor Wundt's and other Savants' Critical Saltomortales" of the cool and depreciative treatment which his book *Psychologie der Suggestion* received at the hands of men of science.

κρς.

L'Hypnotisme devant les Chambres legislatives Belges. Par *J. Delbœuf*. Paris: Felix Alcan. Pp. 80.

In a recent number of *The Monist* Prof. J. Delbœuf gave the reasons which have induced him to come to the conclusion that "persons in an hypnotic condition preserve at least a sufficient portion of their intelligence, their reason, together with freedom of action, to prevent them from committing deeds that neither their conscience nor their habits approve of." This opinion is entertained by many other hypnotists, but the more general opinion is that "suggestion" may be made use of for criminal purposes. Such is the case especially in France and in Belgium; and acting on that supposition the medical faculty of the latter country promoted in the legislative Chamber a law interdicting public hypnotic séances, and reserving the practice of hypnotism as a therapeutic measure exclusively to medical men, as well as the treatment of insane persons and those under twenty-one years of age. Professor Delbœuf, who is not a medical man, naturally objects when those who but a few years ago would have classed him and his fellow hypnotists as charlatans, seek without reason to reserve for themselves the promising field of labor opened up by the researches of others. He maintains that men are born hypnotisers as they are born artists, and therefore to exclude all but medical men from the application of the hypnotic power will often prevent its use for curative purposes. Moreover it is a serious question for those who possess this natural gift. They might perform the most praiseworthy actions and yet be subjected to a legal penalty. Professor Delbœuf states that by hypnotism he cured a youth eighteen years of age of a mania for stealing *(la manie du vol)*, and thus saved him from unmerited dishonor. On another occasion he had charge of a young wife who was possessed with the idea of murdering her children, and after all other means had failed he was able to remove the idea by suggestion extending over a period of eight days. He properly asks whether the performance of such actions ought to be treated as criminal.

The real question to be considered, however, is whether the practice of hypnotism is likely to be made use of for criminal purposes if it is permitted to every one. We much doubt whether any actual case of such an abuse has been legally established, or whether suggestion could lead to the perpetration of a criminal act unless

there was a predisposition in that direction. Professor Delbœuf makes use, however, of an apparent paradox which would seem to render abortive any such law of prevention as that above referred to. It is that there is in reality no such thing as hypnotism. M. Bernheim writes in a letter given in the present work, "for my part, in the thousands of hypnotisations I have practised, I have never seen the least inconvenience result. Undoubtedly very impressionable subjects can, under the emotional influence of auto-suggestion, present certain nervous troubles; but these a prudent operator can always calm by suggestion." Professor Delbœuf relates several cases of this kind within his own experience, which shows that severe nervous pain can be removed by simple assertion that it does not exist. He affirms that "the so-called hypnotic sleep is only a sign of suggestibility, and that it is not at all necessary to suggestive therapeutics."

We may conclude this notice of a very interesting contribution to the discussion as to the true nature and operation of hypnotism, by quoting the conclusions arrived at by the author as to the proper mode of regulating its practice. He suggests that representations of hypnotism should be permitted subject to the measures which regulate public spectacles; that any one should be allowed to become a hypnotiser, as he can become a shampooer or a truss-maker; that the hypnotist who gives remedies should be punishable, since he exercises the art of curing without a diploma; that he should not be allowed to hypnotise minors without the consent of the family; and that he should be forbidden to treat a sick person without the written authorisation of a medical man and under his direction. This rule Professor Delbœuf, although he disapproves of the law which forbids the practice of medicine to those who have not a diploma, has always acted on. He thinks that if medical men then studied hypnotism and practised it themselves, hypnotisers who had no diplomas would soon have nothing to do. This spirited defence by Professor Delbœuf of his views will be widely read. Not the least interesting portion of it is the criticism, with which it ends, of "the affair of the brothers Vandevoir," where we read that he is designated by his opponent M. Masoin "*doux et bon vieillard*" and "*l'homme chevreu*"!

Ω.

Ueber den Hautsinn. By *Dr. phil. et med. Max Dessoir*, Privatdocenten an der Universität zu Berlin. Separat-Abzug aus Archiv für Anatomie und Physiologie. Physiologische Abtheilung. 1892.

This pamphlet, a reprint from the *Archiv für Anatomie und Physiologie* of 1892, is an elaborate and careful investigation into the *modus operandi* of skin sensations. The first part is a discussion of the theory of sensation in general containing (1) an analysis of the ideas *Gefühl*, *Empfindung*, and *Wahrnehmung*, (2) a critique of Johannes Müller's doctrine of specific energies, (3) an exposition of the objectification of sensations. Feeling (*Empfindung*), according to the author, is, no magnitude, its main feature is intensity, quality becomes important only in sensation (*Wahrnehmung*). For the psychology of skin-sensations, we have to note the

great influence of accompanying feelings (*Mitempfindungen*). The second part is devoted to the author's investigations of the sense of temperature. Dr. Dessoir rejects Blix's point theory ; he regards the idea of two different end-apparatuses for warm and cold sensations as an unfounded assumption, and claims that the temperature sense is one mode of sensation possessing two qualities. The intensity of temperature sensations depends not only upon the *vis viva* of the heat in the stimulus, but also upon five other factors (1) the size of the surface affected, (2) the duration of the affect, (3) the thickness of the epidermis, (4) its conductibility, and (5), last not least, its temperature. κρς.

RECHERCHES D'OPTIQUE PHYSIOLOGIQUE ET PHYSIQUE. By *Clémence Royer*. Brussels Imprimerie Veuve Monnom. 1892.

The first part of this brochure consists chiefly of an examination of the theories of M. M. Hirth and Chaveau on chromatic sensation. The talented authoress disagrees with the view entertained by M. Chauveau, that the sensations of contrast which are fused cerebrally, so as to give, when viewed with both eyes, a white image, are subjective in an intellectual sense. The result is purely physico-physiological, as it is even assuming the intervention of M. Hirth's *interior eye*. Mad. Royer regards the eyes organised so as to effect a fusion of the colors and forms depicted on the two retinas, and she accepts the conclusion of M. Hirth, that they lessen the real polychromism of objects, the inability to perceive the infra-red and the ultra-violet rays concealing from us a considerable part "of the palette of nature and of its chromatic scale." The authoress refers with approval to the theory of M. Charpentier that the complementary colors correspond to inverse undulatory phases, which are destroyed by interference in the field of vision.

The second part of Mad. Royer's pamphlet is devoted to a consideration of the photography of colors, and the theory of light. It points out that the photography of colors, which has been effected to some extent by M. Lippmann, must be a physical and not a chemical process. It is the result of the periodic compressions of the sensitised silver-surface, due to the shocks it receives from the light undulations of the ether, which so modify the surfaces of the silver atoms that they reflect colored rays identical with those received from the object photographed. With reference to the propagation of light, the authoress affirms that the atoms of matter, as well as those of the ether, which differs from matter only in being imponderable and without inertia, are centres of emanation of a continuous and inpenetrable fluid, which is however indefinitely expansible or compressible. The size and form of atoms will thus depend on the compressions they receive, and they will be able to accommodate themselves to the spaces to which they are confined by the resistance of the atomic groups by which they are surrounded. But the world may be regarded as consisting of three sorts of atoms : (1) those of the ether which possess their primordial unity of expansive force and are endowed with perfect elasticity ; (2) those of ponderable matter, which have lost a portion of their expansive

force and elasticity; (3) those which are called vitaliferous, because they have regained their expansive force, and are thus capable of autonomous movements necessary to resist the compressions of the ether and to oppose the inertia of matter. They thus answer to the cell-souls of Haeckel. Ω.

DIE BEWEGUNG DER LEBENDIGEN SUBSTANZ. Eine vergleichend-physiologische Untersuchung der Contractionserscheinungen. By *Max Verworn*, Dr. med., Privatdocent der Physiologie an der Universität Jena. Mit 19 Abbildungen. Jena: Gustav Fischer, 1892.

The mechanism of muscle contraction and expansion and the motions of amœboid substance have been recognised as one and the same problem; and several naturalists, foremost among them Hofmeister, Engelmann, and Edmund Montgomery have investigated it, fully aware of the enormous importance of the subject. The present pamphlet is small, it contains only 103 pages, but it contains the statement of the problem, a description of the author's experiments, and his solution so lucidly that one cannot read it without great satisfaction. Both processes, expansion as well as contraction, are, according to Verworn, spontaneous motions, and both are to be explained by chemotropy. Expansion, i. e., in amœba the protrusion of pseudopodia, is due to the plasma's hunger for the oxygen, which is contained in the surrounding medium. Every irritation (electric shocks, concussions, injuries etc.) causes a chemical decomposition of the oxygenised plasma; it loses carbon, hydrogen, oxygen, and nitrogen, (as we know from the waste products, carbonic acid, creatine, lactic acid,) and these substances are exactly those which are most prominent in building up living substance. Irritations without exception cause the plasma to return to the nucleus. The chemical change in the plasma makes it hungry for the nuclear substances. The vital process, accordingly, is an interaction between the nucleus, the plasma, and the medium, so that in the constant exchange of materials the old structure is preserved; and the fundamental features of the vital process are first the plasma's chemotropy for oxygen, causing centrifugal motions, and then its chemotropy for nuclear substance, causing centripetal motions. The plasma saturated with nuclear substances, shows a chemotropy for the oxygen of the medium; it moves in a centrifugal direction, and the oxygenised plasma has become so unstable that it breaks down on the slightest provocation. The decomposed plasma exhibits a chemotropy for nuclear substance and thus returns in contripetal motions to the centre. Without entering into details we may mention that this accounts also for the fact that dying protoplasm always assumes a globular shape, until it crumbles to pieces. The *rigor mortis* is the last vital action of living substance. The plasma seeks once more the nuclear substance, but not finding sufficient material for being built up again into a substance endowed with a chemotropy for oxygen remains rigid until it decays.

The author finds his theory to hold good for the actions of the striated and

nonstriated muscles, and also of ciliated tissues. Having shown that the vital functions are due to the same forces that are observable in the retort of the chemist, he adds: "The savage accordingly was not quite wrong when he drew no distinct line, considering everything moving as alive. Life is motion. That old poetical view of all nature being animated with life throughout was in possession of a germ of truth, and our proud civilisation has actually made a retrogressive step in abandoning this view." κρς.

GRABER'S LEITFADEN DER ZOOLOGIE FÜR DIE OBEREN CLASSEN DER MITTELSCHULEN. Vienna and Prague: F. Tempsky. 1892. Price 1 fl. 60 kr.

We had occasion in a recent number of *The Monist* to review an excellent textbook of physics published by this same house. The present work on zoology is in its second edition, and is intended, like the above-mentioned work of Professor Mach's, for high-school instruction. Professor Graber, its author, died before the completion of the second edition, and the work was finished by J. Mik.

Graber's Zoology is unique in its class; it covers, within the restricted limits of two hundred and sixty-one pages, the whole field of elementary biology, human physiology, and zoology, as it is usually exploited in such books, and thus combines in a single volume what is usually contained in two or three. The human organism (Part 1) is made the starting-point of study in the work, and the explication of the physiological and mechanical functions of animals are thus all grouped about this central figure. In a concise form (55 pages) this book contains about all of human anatomy and physiology that is usually learned in high-schools. Part 1 also contains, at the end of the discussions, brief dietetic suggestions. "Systematic Zoology" is taken up in the Second Part. This part is well analysed and arranged. The cuts are also excellent. Attached to the book is a "Picture-Atlas." This atlas contains a number of colored plates, which depict various physiological and anatomical organs, and also four beautiful representations of scenes from the Naples Aquarium. Although this book will not be used by English school-students, it may be recommended to students of scientific German who wish a good introduction into the technical vocabulary of German biology and zoology, which to the foreigner is very difficult. μκρκ.

L'ANTHROPOLOGIE DU BENGALE. By *Paul Topinard*. Extracted from *L'Anthropologie* for May–June, 1892. Paris: G. Masson.

The present contribution to the science of Anthropology by the Editor of *L'Anthropologie*, is based on the anthropometric inquiries of Mr. H. H. Risley made under instructions from the government of Bengal. The conclusions deduced by Dr. Topinard from the large mass of material brought together by Mr. Risley, and which relates to members of all the castes to be met with in Bengal, are of great interest. He finds that the populations are much mixed, but that they may be divided into three types, one tall and dolichocephalic, that of the Aryans; another short and

brachycephalic, derived from northern Asiatics; and the third short and dolichocephalic, or that of the native blacks. India is a world by itself, and most of its inhabitants belong to races of which there is no specimen in Europe. Dr. Topinard naturally attaches more importance to physical than to ethnographical characters as evidence of anthropological descent, and he is justified by Mr. Risley's researches, of which he speaks very highly; although he thinks they would have been more fruitful if the anthropometrical instructions prepared by the French Anthropologist had been more strictly adhered to. That they were not so is the more surprising as Mr. Risley's work is dedicated to Dr. Topinard himself. Ω.

UEBER SITTLICHE DISPOSITIONEN. By *Dr. Anton Oelzelt-Newin*, Privatdocent an der Universität in Bern. Graz: Leuschner & Lubensky. 1892. Price Mk. 2 70 Pf.

The main idea of this book is to prove that there are certain innate dispositions forming the elements of morality. The elements of morality are according to Dr. Oelzelt-Newin the attitudes of fear, anger, love, sympathy, shame, and pride. Conscience is a complex which has developed from these six dispositions. Having stated sufficient evidences for the heredity of moral dispositions and illustrated the parallel phenomena of bodily states in their reference to moral alienation, the author treats the six elements of morality in single chapters, explaining their causes and the influence of conditions under which they develop either into virtues or crimes. The essay (92 pp.) is a contribution to that ethical determinism which regards evil as the necessary result of given factors. "Religious people should say: Not only the stone which falls from the roof and kills a just man, but also the will of a criminal and the punishment of the judge are inscrutable ordinances of God. That alone is a true theodicy." As an optimist the author trusts that the evil of the world will be conquered with legal means and enjoins priests to revise in this sense their creed, jurists their law, and all men their love of mankind. κρς.

THE BEAUTIES OF NATURE. And the Wonders of the World We live in. By Sir *John Lubbock*. New York: Macmillan & Co. 1892. 429 pages. Price $1.50.

NATUR UND KUNST. Studien zur Entwicklungsgeschichte der Kunst. By *Carus Sterne*. Berlin: Verein für deutsche Literatur. 1892.

The first of these two books is a delightful compilation by Sir John Lubbock. It is another addition to that series of popular works which this well-known naturalist is now giving to English-speaking peoples. It makes no pretension of being scientific: it simply takes the world which science has revealed and shows us its wonders and its beauties. Yet it insinuates many a scientific fact and inculcates many a moral lesson. No one will regret the few hours that can be spent in its perusal, and the stimulus derived from it will heighten the pleasure which every religiously-minded heart takes in the contemplation of natural grandeur and truth. In the main, it is intended for unscientific readers. It requires hardly any prepara-

tory knowledge to be understood; yet it sometimes touches on a truth that even great thinkers overlook. Thus, *à propos* of the capacity for intact divisibility which some life-forms possess, Sir John remarks that these considerations introduce "much difficulty into our conception of the idea of an Individual." "In fact," he says, "the realisation of the idea of an individual gradually becomes more and more difficult, and the continuity of existence, even among the highest animals, gradually forces itself upon us. I believe that as we become more rational, as we realise more fully the conditions of existence, this consideration is likely to have important moral results." The work is divided into the following chapters: "Animal Life," "Plant Life," "Woods and Fields," "Mountains," "Water," "Rivers and Lakes," "The Sea," "The Starry Heavens."

The second of the two books that head this review is by Carus Sterne. Few men possess the wide technical knowledge and the same command of the historical literature of his subject, that this investigator and writer possesses. Carus Sterne unites with a rigorous scientific training the rare qualities of philosophical insight and sound erudition. He possesses the scientific facts on which to base valid judgments, and he deduces from these facts the inferences that affect the most important problems of life—its culture and morality. We have had occasion before, to refer to these phases of Carus Sterne's activity as an author.

In the present work the author of *Werden und Vergehen* discusses the relations which obtain between nature and art. Here is not the place to give even a synopsis of the great wealth of material which this book of 395 pages contains; we are allowed simply to hint at its purport and methods. Carus Sterne defines the artistic impulse in man to be a longing of the mind to rise above the ordinary routine of physical existence. It is a lifting ourselves out of our every-day life. This cannot be accomplished by the simple reproduction of the things of nature; such reproductions have not in themselves an elevating effect. Art is not imitative, art is creative. It uses color, form, space, merely as a means to give "local habitation" to an idea. The imitation of actually existing things is the beginning of art; but it is its lowest stage. Nature must be our guide, our norm, not our model. Here the middle road is taken between the old and the new idea of art. That was ultra-idealistic, this is ultra-realistic. The author then proceeds to discuss the notion of beauty in art and nature (Part I) and finally takes up generally (Part II) the subject of the artistic contemplation and reproduction of the world. All these topics, with their many subdivisions, are treated in Carus Sterne's best and most fascinating style. The work is well illustrated, and all interested in the natural history of art will find in it a store-house of valuable material.

μκρκ.

PERIODICALS.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE.

CONTENTS: Vol. IV. No. 3.

UEBER DIE SOGENANNTE CONSCIENCE MUSCULAIRE (DUCHENNE). By *A. Pick.*

EINE NEUE THEORIE DER LICHTEMPFINDUNGEN. By *Christine Ladd-Franklin.*

LITTERATURBERICHT. (Hamburg and Leipsic: Leopold Voss.)

Mrs. Christine Ladd Franklin (a contributor to this number of *The Monist*) is one of those few women who have actually won a well deserved reputation as a thinker and scientific worker. She is an American by birth and the wife of an American savant. It is pleasant to find her name in a German periodical among whose editorial writers are men so prominent as Ebbinghaus, König, Exner, Helmholtz, Hering, Kries, Lipps, G. E. Müller, Pelman, Preyer, and Stumpf. Mrs. Ladd criticises Helmholtz and Hering, and thinks that the theories of Donders (in Gräfe's "Archiv," 1884) and Göller (in Du Bois-Reymond's "Archiv," 1888) have not received sufficient attention. In accord with their propositions, she sets forth an exceedingly simple hypothesis which attempts an explanation of the three main colors by atomic motions in the three different dimensions of space.

PHILOSOPHISCHE MONATSHEFTE.

CONTENTS: Vol. XXVIII. Nos. 9 and 10.

UEBER DIE GRUNDFORMEN DER VORSTELLUNGSVERBINDUNG. Psychologische Studie. (Concluded.) By *M. Offner.*

DER BEGRIFF DER VERSCHMELZUNG UND DAMIT ZUSAMMENHÄNGENDES IN STUMPF'S "TONPSYCHOLOGIE," BAND II. By *Th. Lipps.*

WERKE ZUR PHILOSOPHIE DER GESCHICHTE UND DES SOCIALEN LEBENS (Third Article: *J. S. Mackenzie*, An Introduction to Social Philosophy; *J. H. Ferguson*, The Philosophy of Civilisation; *W. A. Macdonald*, Humanitism). By *F. Tönnies.*

CONTENTS: Vol. XXIX. No. 1 and 2.

DIE MODERNE ENERGETIK IN IHRER BEDEUTUNG FÜR DIE ERKENNTNISSKRITIK. By *K. Lasswitz.*

DIE SITTLICHE FRAGE EINE SOCIALE FRAGE (I). By *F. Staudinger.*

RELIGIONSPHILOSOPHISCHE THESEN. By *E. von Hartmann.*

LITTERATURBERICHT. (Berlin: Dr. R. Salinger.)

ZEITSCHRIFT FÜR PHILOSOPHIE UND PHILOSOPHISCHE KRITIK. Vol. 101. No. 1.

CONTENTS:

PSYCHOLOGISCHE APHORISMEN. By *Otto Liebmann.*
UNTERHALB UND OBERHALB VON GUT UND BÖSE. By *Eduard von Hartmann.*
JAHRESBERICHT ÜBER ERSCHEINUNGEN DER ANGLO-AMERIKANISCHEN LITTERATUR AUS DER ZEIT VON 1890–1891. By *Friedrich Jodl.*
ZUR BEGRÜSSUNG DES ZWEITEN HUNDERTS DER BÄNDE DIESER ZEITSCHRIFT. By *Prof. Dr. Rud. Seydel.*
RECENSIONEN. (Leipsic: C. E. M. Pfeffer.)

THE AMERICAN JOURNAL OF PSYCHOLOGY. October, 1892. Vol. V. No. 1.

CONTENTS:

DISTURBANCE OF THE ATTENTION DURING SIMPLE MENTAL PROCESSES. By *Edgar James Swift.*
PSEUDO-CHROMESTHESIA, OR THE ASSOCIATION OF COLORS WITH WORDS, LETTERS, AND SOUNDS. By *William O. Krohn*, Ph. D.
REPORT ON AN EXPERIMENTAL TEST OF MUSICAL EXPRESSIVENESS. (Part II.) By *Benjamin Ives Gilman.*

The present investigation made by Mr. Edgar James Swift shows that a disturbance of the attention through sight is more effective in lengthening the reaction time than when the disturbance comes through the sense of hearing; but whenever the reaction follows a slight sensation, the time of choice is less affected by disturbances of the attention than if the excitation is a sound. Dr. William O. Krohn concludes, after carefully studying several hundred cases of pseudo-chromesthesia, that a greater per cent. of them arise from some sort of cerebral work due to the close relation of the cortical centres. Mr. Gilman concludes from experiments made with various persons, that musical expressiveness has been overestimated, and that on the emotional theory of its nature the importance of the art has also been overestimated. (Worcester: J. H. Orpha.)

MIND. New Series. No. 4. October, 1892.

CONTENTS:

THE FIELD OF ÆSTHETICS PSYCHOLOGICALLY CONSIDERED, II. By *Henry Rutgers Marshall*
LOTZE'S ANTITHESIS BETWEEN THOUGHT AND THINGS, II. By *A. Eastwood.*
THE STUDY OF CRIME. By *Rev. W. D. Morrison.*
ON THE PROPERTIES OF A ONE-DIMENSIONAL MANIFOLD. By *Benj. Ives Gilman.*

In his present article Mr. H. R. Marshall finds a basis for the differentiation of Æsthetics from Hedonics, in "pleasure permanency in revival" as belonging particularly to the former. Mr. Eastwood criticises Lotze's antithesis between thoughts and things which is closely connected with his erroneous opinion that time is a property of things in themselves. The study of crime by Mr. W. D. Morrison discusses crime under the three heads of the movement of crime, its causes, and

its repression, of which the last deals with the theory, the methods, and the efficacy of punishment. In his discussion of the properties of a one-dimensional manifold, examples of which are time, the straight line, quantity, intensity, number, and pitch, Mr. B. I. Gilman, who was a pupil of Mr. C. S. Peirce, seeks to give a formulation of one-dimensionality in which the general notion of relation and converse relation is substituted for that of greater and less difference. This number of *Mind* contains a voluminous note on the blind deaf-mute child, Helen Keller, by Prof G. C. Robertson, the late editor, whose death is announced in the same number. (London : Williams & Norgate.) Ω.

INTERNATIONAL JOURNAL OF ETHICS. October, 1892. Vol. III. No. 1.

CONTENTS:

The National Traits of the Germans as seen in their Religion. By *Prof. Otto Pfleiderer*, D. D., University of Berlin.
Philanthropy and Morality. By *Father Huntington*.
International Quarrels and their Settlement. By *Leonard H. West*, LL. D., London University.
1792.—Year I. By *David G. Ritchie*, Jesus College, Oxford.
Utilitarianism. By *A. L. Hodder*.
Book Reviews.
(Philadelphia : *International Journal of Ethics*, 118 S. Twelfth Street.)

THE PHILOSOPHICAL REVIEW.

CONTENTS: Vol. I. No. 5.

Psychogenesis. By *President David J. Hill*.
The Problem of Epistemology. By *Professor Andrew Seth*.
The Origin of Pleasure and Pain, (II.) By *Dr. Herbert Nichols*.
Discussions: Reality and "Idealism." By *F. C. S. Schiller*.
Reviews of Books.
Summaries of Articles.

CONTENTS: Vol. I. No. 6.

Green's Theory of the Moral Motive. By *Prof. John Dewey*.
Thought before Language. By *Prof. William James*.
Pleasure-Pain, and Sensation. By *Henry Rutgers Marshall*.
Reviews of Books.
Summaries of Articles.
(Boston, New York, Chicago : Ginn & Company.)

THE NEW WORLD. December, 1892. Vol. I. No. 4.

CONTENTS:

The Brahmo Somaj. By *Protap Chunder Mozoomdar*.
The Future of Christianity. By *William M. Salter*.
Progressive Orthodoxy. By *Egbert C. Smyth*.
Michael Servetus. By *Joseph Henry Allen*.

THE PRESENT POSITION OF THE ROMAN CATHOLIC CHURCH. By *G. Santayana.*
THE CHURCH IN GERMANY AND THE SOCIAL QUESTION. By *John Graham Brooks.*
A WORLD OUTSIDE OF SCIENCE. By *Thomas Wentworth Higginson.*
THE BIRTH AND INFANCY OF JESUS. By *Albert Réville.*
THE MONISTIC THEORY OF THE SOUL. By *James T. Bixby.*

The last article is a criticism to the point, discriminating and fair. The author takes special notice of Dr. Carus's position, whose views are recapitulated with accuracy, but not accepted as convincing. (Boston: Houghton, Mifflin, & Co.)

REVUE PHILOSOPHIQUE.

CONTENTS: September, 1892. No. 201.

LA PERSONNALITÉ DANS LES RÊVES. By *J.-M. Guardia.*
HISTOIRE ET PHILOSOPHIE RELIGIEUSES. By *M. Vernes.*
SUR LA TERMINOLOGIE PHILOSOPHIQUE. By *Durand (de Gros).*
COMPTES RENDUS ET NOTICES BIBLIOGRAPHIQUES.

CONTENTS: October, 1892. No. 202.

DU TROUBLE DES FACULTÉS MUSICALES DANS L'APHASIE. By *Dr. Brazier.*
LE DÉVELOPPEMENT DE LA VOLONTÉ. (Concluded.) By *A. Fouillée.*
LE MOUVEMENT PÉDAGOGIQUE. By *E. Blum.*
ANALYSES ET COMPTES RENDUS.
REVUES DES PÉRIODIQUES ÉTRANGERS.

CONTENTS: November, 1892. No. 203.

LA PSYCHOLOGIE DE W. JAMES. By *L. Marillier.*
DE L'UNITÉ DE LA SCIENCE: LES GRANDES SYNTHÈSES DU SAVOIR. By *E. de Roberty.*
SUR LES DIVERSES FORMES DU CARACTÈRE. By *Th. Ribot.*
VARIÉTÉS.
ANALYSES ET COMPTES RENDUS.
REVUE DES PÉRIODIQUES ÉTRANGERS. (Paris: Félix Alcan.)

PHILOSOPHISCHES JAHRBUCH. Vol. V. No. 4.

CONTENTS:

DIE NEUESTE PHASE DES SCHOPENHAUERIANISMUS. (Concluded.) *Bäumker.*
DIE SPECULATIVEN GRUNDLAGEN DER OPTISCHEN WELLENTHEORIE. (Concluded.) *S. J. Linsmeier.*
RELIGION UND ENTWICKELUNGSTHEORIE. (Concluded.) *Schanz.*
DER SUBSTANZBEGRIFF BEI CARTESIUS IM ZUSAMMENHANG MIT DER SCHOLASTISCHEN UND NEUEREN PHILOSOPHIE. (Continued.) *S. J. (C.) Ludewig.*
RECENSIONEN UND REFERATE. (Fulda: Fuldaer Actien-Druckerei.)

VOL. III. APRIL, 1893. NO. 3.

THE MONIST.

RELIGION AND MODERN SCIENCE.

I.

THE ancient conflict between religion and science is now, at the close of the nineteenth century, more animated than ever before. This conflict has formed the intellectual pivot of civilisation ever since Christianity first afforded the western peoples of Europe the inconsistent spectacle of a religion which made abundant use in its dogmatic constructions of the theories of contemporary science, and yet assumed a hostile attitude towards the fundamental principle of all science, the spirit of research and unbiassed judgment generally. Rightly has one of the acutest modern critics of Christianity, Ludwig Feuerbach,* maintained, that the Christian sophistic philosophy is the necessary outcome of this inconsistency, which proclaims as absolute truth a definite, historical revelation, such as is found in the Bible, and simply assigns to the reason the subordinate and improper office of harmonising and defending what is there laid down.

There are, it is true, a great number of people, who are not disposed to see the bitterness of the conflict now raging. It has become customary for us to look upon the nineteenth century as an age of the comprehension of religion, and to distinguish it from the eighteenth century, which is regarded as a period of mere religious criticism. We boast of having rediscovered religion, and of having

* *Wesen des Christenthums.* First edition. 1841. Pp. 288–289.

secured to it a permanent province in the dominion of the mind. But the facts of our public life stand in curious contradiction to these assertions. In all civilised nations, in literature, in parliamentary procedures, in all questions that relate to religious and moral life or to education, the attentive observer will find that a profound chasm divides humanity. Every one feels the desirableness of bridging over this chasm, that the members of society may be united in common labor; but again and again we are made to experience how irreconcilable the respective claims of the opposed parties are. He who has studied the bulls and encyclical letters of the last two popes, Pius IX. and Leo XIII., and the commentaries on these utterances in the *Civiltà Cattolica*, the official organ of the curia; he who is acquainted with the polemical diatribes of the French Catholics against the positivists and freethinkers, and against the school and church legislation of the third republic; he who has any knowledge of that mass of controversial literature, which the proclamation of the doctrine of papal infallibility in the year 1870 evoked; he who has followed the eventful and varied history of the so-called "Culturkampf" in the German Empire, from the era of the minister Falk, down to the recent bill for a new School-law in Prussia, defeated amidst the greatest excitement in all parts of Germany; he who is the least bit at home in the literary feuds which are being fought out in the domain of historical theology concerning the validity and credibility of the original sources of Christianity; he, finally, who will place the writings of Cardinal Newman or of the Jesuits Pesch and Cathrein by the side of those of Huxley and Spencer, by the side of those of Du Bois-Reymond, Strauss, and Dühring: he, I say, who has gone through with a critical spirit all that I have cited in the preceding sentences, will surely not be apt to contradict this assertion of mine that civilised humanity to-day is separated into two groups which no longer understand each other, which do not speak the same language, and which live in totally different worlds of thought and sentiment—at least so far as this one critical point is concerned of man's relation to religion.

"*Wie Ja und Nein sind sie,*
Wie Sturm und Regenbogen."

Have we, then, learned nothing and forgotten nothing since the days of rationalism? The tremendous labors which our own century has devoted to the investigation of religion in all its forms, to the unfolding of its connection with racial mind and sentiment, and of its relation to civilisation generally, and finally to the elucidation of the origin and development of the great forms of religion: has all this had no other result than that we, after a century of the most laborious research, again find ourselves in the same attitude of unintelligent hostility towards religion and Christianity in which the eighteenth century revelled, and out of which we have only fought our way by the united efforts of a host of profoundly enlightened minds?

This argument has been advanced in opposition to the leaders of the rationalistic movement and to the work of the eighteenth century in varying forms, by the party which seeks to ally the science of the present and the religion of the past. It is seriously said and enjoined that only they who are far behind the science of the times and hold aloof from the true spirit of the age can still assume the repugnant attitude toward religion which was characteristic of the mind of the eighteenth century.

It is high time to point out the crude confusion of ideas which lies at the basis of this argument. It confounds the historical understanding of a thing with the philosophical approval of it. But these are two totally distinct things. We understand a phenomenon historically, when we are clear in our minds concerning the external conditions and habits of thought of humanity from which it sprung; when its main-springs of action and its purposes, as well as the effects which have proceeded from it, are distinctly traceable. The more closely our mental pictures of these things correspond to the facts as they actually were at the origin, and the more they conduct us from the mere surface of phenomena into the secrets of their psychological and sociological connection, and teach us to understand these things as products of mind and of society, the higher will our historical knowledge of them be rated. In this sense the knowledge which the eighteenth century had of religious phenomena was undoubtedly very imperfect. True, even here great advances beyond

the age which preceded, are noticeable. People had ceased to regard the origin of the Jewish and Christian religion as a supernatural event and as the immediate work of God; all religions were placed upon the same footing, as species of the same kind; and efforts were made to discover their common characteristics and the law of their origin. But the people of that period were not yet able to arrive at the true essence of religious ideas and sentiments. They were hardly in a position to describe them properly, let alone to explain them. Of the hypotheses devised to throw some light into the darkness that hung over the beginnings of religions, not one proved itself competent to supply what was hoped for. All that they could derive from these fictions was that notable caricature of religion which their age had directly before its eyes, and to free themselves from which they strained every nerve. With the keen vision of hate they uncovered all the infirmities of religion, all the terrors and iniquities which have followed in its train, all the injurious effects to civilisation which have proceeded from it. They created a negative picture of religion, which has lost nothing of its partial historical truth by the fact that many of its features are farther withdrawn from our immediate experience than they were from that of the times in question.

But it was the nineteenth century that first worked out the true psychology of religious man, and again came into possession of that spirit of congeniality which is absolutely necessary to our entering into the mental life of far-distant times. To the men of the rationalistic age the history of religion was simply the history of the obscuration of the pure, natural religion, which was supposed to be constituted of a rational idea of God and a system of humane ethics, and which was indistinctly conceived at times as the logical, and at times as the historical, antecedent of the concrete religions. The latter appeared as the corruption of the natural and simple order of things—a corruption produced by superstition, by the wily exploitation of human credulity and human needs, by the scheming machinations of the founders of religions and of priests, by human delight in the marvellous, by the falsification of the natural moral sentiments, and by the stirring into life of fanatical passions. We know

to-day that this so-called natural religion is nothing more than a product of late abstraction and reflection; that the motives and selfish interests above cited have been abundantly at work in religious history, but are nevertheless unable to explain the internal motive force and tremendous vitality of these spiritual products. We know to-day that religions spring with the same necessity and in conformity with similar laws from the depths of the human mind as language and art, and that they form an integral constituent part of the structure of civilisation and an important weapon of humanity in the struggle for existence. In symbolical form they embody the highest treasures and highest ideals of national existence; in its gods humanity beholds the imaginative perfection and explanation of its view of the world; and in its religious practices, in its worship, in prayer, it strives to realise the wishes and aspirations which seem to lie beyond the reach of its powers.

Many a riddle still remains to be solved, as is natural in a domain that extends into the most hidden recesses of the human soul, and whose obscurity is augmented by the fact that in the majority of cases the most important and significant elements must be collected with infinite pains from the rubbish of fantastic traditions. But upon the whole the active labors of a century which calls itself with pride "the historical century," have borne their fruits. With respect to the intrinsic character and the significance of religion for civilisation, there is now every reason why a unity of opinion should prevail among all who take their stand on the common ground of modern scientific research, whether they be friends or opponents of religion.

But how does a knowledge of what religion has been in the past affect our estimate of it in the present? Do we approve of an institution or phenomenon, because we understand how it was once possible, nay, must have existed, and what it signified? We understand to-day the Roman law, the Ptolemaic astronomy, the scholastic philosophy, feudalism, and absolute monarchy, thoroughly; we know the conditions which gave rise to them, the necessity of their appearance, and the measure of their performances; but does it occur to us, for these reasons, to perpetuate and make them im-

mortal because they had once an historical significance? What an institution in its essence is, what in past times it has accomplished, is an inquiry that must be conducted with quite different means from that whether it is applicable to a definite present set of relations and necessities. The historian can render this task more easy by teaching us to understand the general laws and necessities of national life from the analogies of the past; but as a prophet he will always be one that looks backwards, and it is ever to be feared that he, too, will see the present in the light of the past. For to him alone does the past lift its obscuring veil, who, forgetful of self and unmindful of sacrifices, can listen to the voices of remote times and peoples, who with a mind of Protean cast has the power to transform his intellectual being into that to which, solely by description, he seeks to give new life and form. The past becomes a part of him; he loves it, he admires it. And from the reanimation of the past in historical pictures to the attempt of a renewal of it in life is but a single step.

Innumerable are those who have succumbed to this temptation. The entire religious tendency of the nineteenth century exhibits this process on a grand scale. This tendency is based on profound antiquarian studies of the past—on that newly awakened historical interest, which aims not only to criticise but to understand religion and ecclesiastical institutions. Much that in the previous century seemed dead or destined to perish, had been restored to life by it. The whole historical structure of the Christian religion, which at the close of the age of rationalism only existed, it would seem, as an artificially preserved ruin, has received, through the instrumentality of these methods of thought, new supports, and has again been made habitable for the human mind. Unmindful of the complaints of churchmen, the future historian of civilisation will have to characterise the second half of the nineteenth century as a period of religious renaissance. And it is no accident, but a symptom of deep import, that this century has completed almost all the great cathedrals which were left unfinished and in partial ruins by the middle ages, and placed them in their colossal grandeur before the world as lasting monuments of its habits and tendencies of thought.

Yet the spirit of science has also not been inactive. Political progress has freed it from the despotic police supervision which even in the eighteenth century heavily oppressed it. In principle at least, freedom of thought and inquiry are to-day acknowledged by all governments, with the single exception of the Roman curia, although in practice there are by no means few efforts made, by influencing its representatives, to have that proclaimed which it is desired should be proclaimed. Infinitely great has the number of workers grown, the instruments of inquiry, the confidence of the human mind in itself, and our power generally. And if formerly people could conceive of no other science than such as stood in the service of the church, to-day science claims it most emphatically and confidently as its privilege and duty to search and test the logical truth of the most sacred traditions, and thus to base the thought of future generations, not on the naïve faith of their fathers, but on the demonstrable truths of actual present knowledge.

II.

Between the two groups of modern humanity, of which the one seeks to retain the Christian religion in its historical form as the precious heritage of the past, and the other to supplant it by a new Idealism formed in harmony with the spirit of science, a third class stands, which plays the part of a mediator. This class concedes that the traditional forms of religion are in great part unadapted to the modern mind, and that historical Christianity is in need of improvement, but contends that religion is an ineradicable constituent of all higher civilisation, and must remain so, and, particularly, that Christianity is the absolute religion, that is to say, that in Christianity as rightly understood and naturally developed all the necessary elements of the true religion of the future are contained.

I should like, in the following pages, to subject the contentions of this mediatory group to a critical examination, and to discuss the question whether it is at all possible for one who resolutely takes his stand on the ground of modern scientific thought, logically to have religion in the historical sense at all.

In effecting a mediation between the religious and scientific views of the world,—views which appear to be separated from each other by a profound intellectual abyss,—two ways may, generally speaking, be pursued. Both have been frequently trodden since the days of rationalism. I shall discuss each separately.

The attempt may be made to resume, in a form more adapted to modern times, the work of the reformers of the sixteenth century; to go back even more thoroughly than they did to the original and simplest forms of Christianity, to remove *in toto* the superstructure which has been reared upon it in the course of time, and to exhibit to humanity "the pure doctrine of Christ" as the source from which to-day, as a thousand years ago, true comfort may proceed, as the simplest, purest, and most exalted expression of the divine and human that has ever yet been discovered. Many of the most erudite workers in the field of critical theology which this century can show have placed themselves in the service of this idea, which is preached with particular enthusiasm by the so-called "free-religious" and Unitarian confessions, and which at times has also exhibited a noble and conciliatory activity in the homiletical work of some mild-minded and liberal clergymen in the evangelical churches. But our special inquiry here must be concerning the logical and scientific foundation of this modernised primitive Christianity, and on this point it must be frankly stated that the more faithfully such a Christianity reflects the biblical character, the remoter it is from our modern thought, and the more it is dominated by modern ways of thinking, the more unhistorical and hence the more unchristian it becomes.

The "pure doctrine of Christ," the genuine, primitive form of Christianity, is a Utopia of biblical criticism. What we actually possess, in the form of historical documents, is that conception of the doctrines and life of Christ which was put in writing several generations after his death, and which, from amid a much greater number of contemporaneous attempts, met by preference with the approbation of the church. It is a hopeless task to attempt from these late records, which betray the most various intellectual influences, to derive the authentic doctrines of the oldest form of Christianity. No method, subjective prepossession only, can here render

a verdict. The things that appear especially consistent and homogeneous to individual theologians and critics are stamped as the genuine utterances of the Master. As every time has done, so ours also constructs its picture of Christ to conform with its wishes and wants.

But granting even that there is nothing objectionable in this, and that this procedure is perfectly justified, a number of difficulties still stand in the way of this movement which have stamped the procedure of even the most ingenious of its representatives as the outcome of pure subjective caprice. All the written sources which we possess of the life and teachings of Christ contain much that is in the highest degree repugnant to the modern mind. I refer particularly to the miracles. The difficulties which they present may be disposed of in various ways; as, to give an example, by the method of the early rationalistic thinkers, who accepted the miracles as facts, but sought to give them a rational explanation, or by that of Strauss, who held that they were the mythical and poetical raiment of religious ideas and sentiments. Yet no art of interpretation will banish from the world that fact which the poet expressed in the words:

"*Das Wunder ist des Glaubens liebstes Kind.*"

The fact that the entire cast of thought and sentiment of early Christianity is saturated with the belief in the marvellous, and with the expectations, nay, with the actual need of miracles, and that this is not an adscititious ornament which can be doffed at pleasure, like a dress which we have outgrown, but is of the very essence of Christianity. Here is rooted that childlike and simple belief in the limitless and God-coercing power of prayer, for which no natural laws nor force of necessity exists, which is omnipotent as the Godhead itself, and as all-powerful as desire. Here is rooted that ardent conviction of the near collapse of the entire world, of the coming kingdom of perfection which shall proceed, not from deeds and thought, but from faith and grace, and shall crown all human desires with glory. And intimately connected with all this stands the idea, visible in the background of all the moral prescripts of the gospels, and painted in the strongest colors, of a system of punishments and re-

wards in the world beyond; which makes of a God of love, a pitiless, infuriate God of vengeance.

These things are so intimately interwoven with the modes of thought of the synoptic writers that it is impossible to separate them therefrom without doing violence to the internal connection of their doctrines. They who seek after a more spiritual conception may, it is true, find it in the gospel of John. But this book is so completely dominated by the metaphysical-religious speculation of the second century, and by the effort to bring the history of the life and doctrines of the Nazarene in the service of the Logos idea, that the modern mind can only with great difficulty find a common ground of understanding with it.

The task of the modern reformers is, for these reasons, a very difficult one. They cannot but concede that Christianity, even in its purely evangelical form, contains much that is foreign to us, and that the elements of which it is composed must in part be excised and in part improved by criticism and interpretation.

But the more the critical sense which is brought to bear upon this task is developed in the spirit of modern scientific thought, the more will historical Christianity shrink to the form of a mere colorless abstraction, and ultimately nothing remains of its exuberant yet visionary mental world but the picture of a philanthropic life joined to a strongly developed consciousness of God, which proclaims a popular morality in commandments and parables. But even this latter is inevitably exposed to the same fate as the other ideas. It is dominated throughout by the extremest notions of rewards and punishments, which the expectation of the doom of the world places in the very immediate future. It is impossible to take the system as a whole, and it must be made the subject of violent interpretation to acquire any fitness for the needs of modern life. Its principles are systematically turned and twisted till they have acquired in some direction practical utility. And who at this day can forget, that this system of morality, wherever and whenever attempts have been made literally and faithfully to imitate it in practical life, has led only to wretched caricatures? Moreover, it is again and again freely remodelled in the spirit of modern ethics, its offensive elements char-

itably cloaked, its useful ones developed to the utmost, and finally here too a complete set of wholly modern ideas consecrated by the borrowed authority of a venerable antiquity.

And therefore I repeat my contention, that the modern reformation, this modern, pure, and scriptural Christianity, will, the honester it is, all the more surely lead its adherents away from Scripture and from Christianity and ultimately bring them to the adoption of a popularly expounded, but philosophically established, ethical system.

I shall now take up the second of the two methods above mentioned. That which we have just considered was known and affected even by the eighteenth century. The discovery of the second is a merit of the present time. The honor belongs in a pre-eminent degree to the speculative philosophy of Germany, and to the intimate relations with theology which this philosophy, especially in the school of Hegel and Schleiermacher, entered into in the first half of the century. (Kant's philosophy was not put to similar use until later.) All these movements, whose rich literary ramifications and development may be followed to the present day in Otto Pfleiderer's excellent and erudite work, "The History of Protestant Theology in Germany Since Kant,"* have also begun in recent times, through Green, Caird, A. Seth, J. Martineau, R. Flint, and F. Robertson, to exert an influence on Anglo-American intellectual life.

The common fundamental feature of this second movement is, that it proposes to accept as pure Christianity, not only the most ancient forms of Christian doctrine accessible to us, but also the entire system of dogmatic thoughts which in the course of the centuries primitive Christianity has produced. Christianity, these men say, has historically existed and acted in these maturer notions. It is not permissible arbitrarily to separate them from it, and to reverse by any authoritative edicts the real historical development. On the contrary, we now may and must continue the process which, by the tenor of dogmatic history, is the process which has continued for centuries, and give to the dogmas the form which best accords with

* Translation published by Swan, Sonnenschein & Co., London, 1891.

modern spiritual needs. To-day as in the days of incipient Christianity, we see by the side of the naïve literal belief, which takes no offence at incomprehensible things if they only suit the needs of its heart, a gnosis arise which strives to reconcile faith and knowledge, religion and intellectual culture; a gnosis which to the unbelieving sceptic quotes the words of the poet:

"Die Geisterwelt ist nicht verschlossen;
Dein Sinn ist zu; dein Herz ist todt!
Auf! bade, Schüler, unverdrossen
Die ird'sche Brust im Morgenroth!"

It is perhaps even more difficult to give a succinct and comprehensive notion of the ideas of this speculative theology, than of the results of the New Testament exegesis of which we spoke above. All gradations are here represented, from tender, conservative regard for the traditional beliefs of the sects and the needs of the pious heart to the boldest speculative interpretations and critical restrictions of dogma, which utterly discard the historical form and hold fast only to a central germinal truth. The present inquiry will restrict itself to those representatives of this gnosis, who as a matter of principle grant the greatest field of action to the rational development of dogma, and represent its philosophical elaboration in its finest and most complicated form. I shall attempt to signalise the ideas which may to-day be designated as the most spiritualised expression of the Christian view of the world.

And first let us hear a greater mind speak. In Ludwig Feuerbach's essays on the nature of religion and Christianity the following sentences occur:

"The Christian religion is the revealed inwardness, the objec-
"tively expressed self of man; the contents of his highest aspira-
"tions; the essence of man purified and freed from the limitations
"of individuality; yet all subjectivised, that is intuited, known, and
"worshipped as a separate, independent entity, wholly distinct from
"himself. Religion is essentially dramatical. God himself is a
"dramatical creation, that is to say, a personal being opposed to
"man. He who takes from religion this idea, takes from it the gist
"of its being, and holds but the *caput mortuum* in his hands."

These sentences of Feuerbach express with the greatest generality and precision the innermost nature of the Christian view of the world. They characterise excellently the point that cannot be given up without destroying the religous view as such. What I refer to is dualism; the dualism of the divine and the human, of the world beyond, and the world that is, of holiness and sin; dualism conceived not merely as a mode of view and of conceptual distinction, as a working contrariety in things that by their nature are one, but as a metaphysical difference, an actual contraposition of two worlds, of two kingdoms of existence, which are totally separate, no matter how extensive the relations of the one to the other may be. Only on such a supposition is that possible which Feuerbach, with inimitable aptness, called "the dramatic element" of religion. The history of humanity, the history of its religious life particularly, is no monologue of humanity with itself into which life and advancement enter solely through the multitude of the ideas created by individuals within the race itself. It is an action or process in a higher sense, an interactivity between two worlds, in which, it is true, humanity, to a certain extent, shapes its own fortunes and destiny, but at the same time is also constantly exposed to the interferences of a power which stands beyond and above it and to which it has to accommodate itself. And whatever artifices and care many of the representatives of the modern gnosis may employ to conceal this fundamental assumption, and to substitute for it the point of view of the immanence of this power in the world, still any radical breach with it is impossible without endangering the very foundations of the religious sense of humanity itself.

The indispensability of this dualistic opposition and separation is equally well exhibited whether we take as our starting-point the existence of the world at large or the individual consciousness of man. The religious mode of view knows of no other way of asserting the rights and activity of the mind in the All than by making all existence assume a personal life in an infinite, self-conscious, and ethically perfect being. The emotions and experiences of one's heart, its vacillations between humility and exaltation, remorse at the consciousness of one's own imperfections, the inspired flight of

the soul to higher realms of existence, appear as the intercourse of man with some extraneous power, allied to man and yet above him, in which the sum of all excellence to which thought and experience have ever led man, has its eternal source.

These ideas constitute the point of view which is decisive of the history of humanity, particularly in what concerns religion. The history of religion is, in accordance with these ideas, conceived as a continuous self-revelation of God in the world of man. True, this view seems to be contradicted by the fact that the self-revelation of this infinitely good power is effected in the case of by far the greater part of mankind in a very insufficient manner—in the form, namely, of crude and superstitious notions which stand in need of constant purification by reason. But the explanation of this fact is sought in the idea of a divine pedagogical training of the human race, and in the theory that religion is not an immediate self-revelation of the absolute, but passes through the medium of the human mind and consequently must be conditioned by its character.

Christianity, now, especially appears as the highest form of this self-revelation of God in humanity, that is to say as the absolute religion, which, in its historical forms, it is true, is as little free from adscititious ornaments and transient obscurations as other religions, yet in its essence can be as little improved as it can be discarded. This innermost essence of Christianity the majority of the representatives of this modern gnosis declare to be the conviction that all men are from the beginning children of God. In this idea two things are contained: submission to the will of God who is conceived as a kind parent and who in pity and love does everything for the best; and the imitation in our own thought and conduct of the ethical perfection conceived incarnate in God. The entering of man into this relation is designated the kingdom of God—a notion which constitutes the ideal goal of history. The condition of mind on which the kingdom of God rests is prefigured in a typical manner in the founder of the Christian religion. His person and his life are a guarantee of the possibility of this ideal, and exhibit at the same time the means of its accomplishment: namely, the helping love of God, which has infused into this one individual the whole plenitude

of its being, so far as this is at all possible with human capacities, that humanity may have in it a direct living picture of the highest fulfilment of its religious and moral destiny. The historical Christ is the ideal of humanity, supported and ensouled by the spirit of God.

The modern gnosis here goes back to the Paulinian interpretation of the Christ-idea. The consideration of the speculative difficulties of the idea of the Trinity is thus rendered superfluous for it. This notion is treated by the majority of its representatives simply as a dogmatic antiquity; its place is taken by the modern ideas of a distinction between the person of Jesus and the principle or spirit of Christianity, which is synonymous with the contrast of the idea and its revelation, the eternal and the temporal, of the inward essence and its historical realisation. That it employs the notions of idea, principle, and essence wholly in a Platonic sense, as the highest metaphysical realities, is self-evident.

More distant still is the attitude which this speculative theology assumes towards another idea which proceeded from the Rabbinical school of thought of Paul: the notion of salvation or redemption in its connection with the expiatory death of Christ. From these conceptions of punitive suffering, of a vicarious atonement of God in his own person—conceptions of such juristical refinement as to be wholly unacceptable to modern modes of thought—the modern gnosis has upon the whole resolutely turned away and taken refuge in that more spiritual and more profound idea which in early Christian times the author of the gospel of St. John promulgated. The death of Christ is redemptive only in the sense in which Christ's total history is redemptive, as the direct and prefigurative incarnation of the true religious relation between God and man. This is, it is true, applicable in a quite special sense to the Death; for it was by this that the eternal truth was manifested, that not only does all salvation accrue to man from the sacrifice of his own self in duteous and patient love, but that all the life of God is an emanation of this self-surrendering excellence, of this bliss of self-sacrifice. Still, there is one thing that is common to all the representatives of this movement as distinguished from the former, and that is this:

they do not content themselves with picturing the activity of Jesus Christ in general outlines solely as one which is blessed and significant by example and doctrine for humanity, but they assume a continuous and active presence of the Christian principle in humanity, by means of which the moral discord in individuals is overcome, and in the personal spiritual life of individuals divine and human nature are united. This is the most speculative interpretation we have of the old dogmatic notion of redemption, which from its original character as a single isolated phenomenon of history has here become the constant activity of a Christian principle, and an ever-living precedent of Christian life.

It would be a prolix and wearisome task to go through in this way the whole dogmatism of this speculative theology. The fundamental ideas which we have discussed will suffice to show the manner in which, on the one hand, it spiritualised the allegorical notions of popular Christianity, but on the other left untouched the gist of the religious view and the dramatical or dualistic opposition of the divine and human. The notions of grace and sanctification, the notion of the church as a living, organised instrument of salvation, spring directly and logically from these fundamental ideas.

In the province of ethics this movement has a much easier task than the churches based on the New Testament. As it seeks to establish, not a primitive Christianity, but a modernised Christianity developed in the spirit of recent times, there is no necessity of its being incommoded by the ethical crudenesses of early Christianity, but it is in the same position to work these crude nessesover critically as it did the asperities of the old dogmas. It can assimilate most of what it needs from modern philosophical ethics, and content itself with giving to what it has thus borrowed a metaphysically religious background derived from dogmatic traditions.

That this modern gnosis is in a constant state of vacillation with respect to the practical things of life, is a necessary consequence of its fundamental assumptions and of its position towards the doctrines of the church. Its foremost representatives acknowledge without any reserve that the true source from which religious emotions and sentiments flow is the symbolic or imaginative faculty of

man. The grandly simple pictures in which the ancient Christian faith found satisfaction are now in the course of time inevitably disintegrated by the critical reason. The speculative theology itself proclaims that its vocation is one of coöperation towards this end. But it maintains nevertheless that the fruits of this work, the speculative interpretation of the dogmas, their exaltation into the sphere of the Idea, are fit only for initiated minds, and are caviare for the general. The general, the people, want and will use religion in the form which its fancy has created, and it cannot be revealed to it in any other. Progressive in its theories, this gnosis is in its ecclesiastical practice thoroughly conservative. It thinks two kinds of thought, and speaks two kinds of languages, according as it finds itself in the pulpit or in the professorial chair. And it is in just this procedure that it assumes a position which it is very difficult to attack. He, who working for a sound and progressive popular enlightenment on the ground of a unitary view of the world, opposes the further use of the antiquated and effete allegories of the old religions, is told that he is behind the times, and that religion, nurtured by the spirit of modern science, has become something different from what it formerly was. In very strict ecclesiastical quarters this gnosis is looked at askance, and accused of insincerity, nay, of secret alliance with unbelief; but the movement never allowed itself to be led astray by these accusations, and has never failed to assert its right of coöperation in the common work of the Christian church. For though it pretends to be in the hands of the thinking theologian a means of bringing into harmony the faith which he must confess and the thought which he cannot abandon, it yet admits, that with the majority of mankind the allegory will always remain an essential element of religion, and that therefore the task of scientific theology can never be to destroy these vessels of religion, but only to exercise a watchful care, that with the form the spirit also may not be lost.

III.

The question now arises,—and this brings us back to the considerations of the first part of this essay,—Does this rationalised

Christianity of to-day really meet the demands of science, and if it does not, is it in the power of the modern scientific world-conception to furnish from its own resources some substitute for the religious views of the past ?

My answer to this question will be short and concise ; for the existence of *The Monist*, the fundamental idea of its management, and the total character of the efforts which it has hitherto made, speak with sufficient emphasis. And we may, therefore, with the greatest respect for the scientific zeal and the personal ability of many of the representatives of this mediatory theology, say, without further ado : This rationalised Christianity of yours also is myth and symbol ; it still adheres to that "dramatic" division of the world which our imaginations produced, and to the metaphysical dualism of God and man ; it cannot lift itself to a rigorous conception of the All in One, for which God is in the same sense a simple function of human thought as thought is a function of the human organism. The God on whom all depends in religion, the God whose name is "Father," the God of love and goodness, the God from whom all great thoughts and all grand resolves spring, the God who sanctifies us and lifts us above the earth—to displace this God from the world in which he has no place, into the inward being of humanity seems at this day so strange, nay, inconceivable, only because we have accustomed ourselves (and down to the times of Mill and Feuerbach, even strict monistic thinkers like Spinoza fell victims to this illusion) to mingle together in the idea of God two wholly distinct ideas—the ideas, namely, of nature and of an ethical ideal. To preserve this latter inviolate, and to secure it from all encroachments of human caprice, one thing alone seemed to the naïve dramatic modes of thought of early times a competent safeguard : the ideal must in some locality be real ; the highest to which human thought and aspiration can exalt itself must be sought and must exist in some superhuman reality. And what reality could be better adapted to this than one on which even nature was conceived to be dependent ? The entire history of the development of the idea of God in the Græco-Roman and Hebrew worlds, the confluence of these two streams of thought in Christian speculation, exhibit in the clearest

possible manner these motives, which here I can only lightly touch upon.

But this combination of the law of nature and the law of ethics in the idea of God, although solving some of the difficulties of humanity, has plunged it into incomparably greater ones. Through all the centuries of Christian thought a succession of desperate attempts may be traced to establish a theodicy, that is to say, attempts to demonstrate the existence in nature and in history of a God which harmonises with the ethical ideal. Even Kant could undertake to demonstrate the "necessary failure of all attempts at a theodicy," and whoever might still have entertained any doubt as to the correctness of this demonstration, such a one must surely have been convinced of it by the scientific development of the past century. That which was indissolubly welded together in the Christian idea of God is to-day disintegrated into its component elements. The Lord *above* nature, the Spirit *behind* nature, have been rendered inconceivable by the modern notions of the conformity to law of all natural occurrences and of the unity of all existence. The spirit immanent in the All no thinker will deny, for this spirit manifests itself in an indisputable manner in the fact that this All is a cosmos, not a chaos, that not only the caprice of chance but also the laws of necessity rule in it, and that the personal self-conscious mind springs from its midst. But from this recognition of mind in the All, there is no bridge that leads to the old idea of God. We cannot worship the All as a moral ideal. We involve ourselves in absurd complications when we attempt to derive the actions of natural events and their conformity to law from ethical categories, and it is no less a desperate undertaking to imagine that we can draw impulses for our moral thought and conduct from nature. The adaptation of means to ends, the teleology, that rules in the All, is veiled for us in the deepest obscurity. All that we can unravel of it has no resemblance to that which, according to our notions, is ethical:

"*Denn unfühlend ist die Natur,*"

she does not know what love or mercy is; she knows only the omnipotent power of universal laws; she knows only the rights of the

whole, to which she sacrifices with unconcern the individual; she revels in the double pleasure of unceasing creation and unceasing destruction; she arms unpityingly the strong against the weak; in crises of annihilation she restores the disturbed equilibrium of things; but the palm of peace no one has ever seen in her hand. And we? We stand amazed at her might and greatness, at the plentitude of her powers of creation, at her myriad play of forces, at the inexhaustible wealth of the relations with which she binds being to being, creates and mediates contrarieties, and amidst the most varied change and alternation, ever remains one and the same! But our prototype, our God, she can never be. To him we must look up; but on nature, despite her might, despite her stupendous grandeur, we look down. She did not whisper in our ears that in us which is best and highest. That did not come to us from heaven; *we ourselves* won it by hard struggles, by terribly severe, self-imposed discipline. It is not *of* nature; it is *above* nature. Through *us* something has come into the world that before us did not exist—something that the most exuberant creative magic, or nature's grandest mechanical dreams, could never replace. The day on which first a human being pressed his weaker fellow-man to his breast and said, "Brother, not mine, but thy will be done; I will give up my desires that thou also mayst be glad"; the day on which man first lifted up his head and said, "Let us make the world *good* in the likeness of the picture that has become living in us, just as it should be"; this is the great and sanctified day in the history of our race on earth, the Christmas day on which God was born. But not as the religious fancy has expressed it, the day on which God became man, but the day on which man began to become God, that is the day on which he began to feel spiritual powers in his breast that transcended his animal impulses—powers to which the majority of humanity was still as remote as heaven from earth.

This strict anthropological conception of God as the ideal which is always newly creating itself in the struggles of humanity, which is no Being but a Becoming, solves the innumerable difficulties which the idea of God has hitherto placed in the way of rigorous scientific knowledge and the construction of a unitary conception of

the world. This God has nothing to do with the All. We need not seek him in the All or behind the All, and need not fear that any progress of our knowledge will make his existence a matter of doubt with us. Concerning the real validity of this idea we need not bother ourselves with more or less weak and insufficient demonstrations: the whole history of humanity is evidence of it if we but know how to rightly interpret it, and the stumbling block of the old theological idea of God has become the corner-stone upon which the new scientific conception is built.

Nature and human history the work of an omnipotent and all-kind being that is mediately and immediately active in all events, nay, sacrificed himself in his own person that he might realise in this world his purposes! Compare the principle, the active force of this world-drama, pictured by the religious fancy as the highest power, the highest wisdom, and all-merciful love, with the real spectacle of the world! Is there anywhere a more pronounced contradiction, an obscurer riddle, a more inconceivable contrast between purpose and accomplishment? This world of cruelty and woe, in which one creature feeds on the heart-blood of another, in which here and there from seas of mud and dirt a form of light springs up, in which every nobler production must be bought with torrents of blood and tears; this revelation and self-manifestation of God in humanity, which everywhere appears joined to definite historical suppositions, which lacks all the conditions of true universality and of indisputable evidence, so that instead of forming a means of union it has become the source of dreadful contentions; this work of salvation and sanctification which is so restricted in its effects that "the kingdom of God" is still a dreamy vision of humanity, so restricted that we still see the majority of men, despite the most extraordinary supernatural dispositions, still remain far behind the simple ideals of natural ethical commandments, that hate and dissension, cruelty and selfishness, perform their unhallowed work—is this the work of infinite power and infinite wisdom? What claims theodicy makes on human thought! And how different the picture is, the moment we abandon the false theocentric point of view and assume the anthropocentric! Instead of a belief which all facts contradict—an

they do not content themselves with picturing the activity of Jesus Christ in general outlines solely as one which is blessed and significant by example and doctrine for humanity, but they assume a continuous and active presence of the Christian principle in humanity, by means of which the moral discord in individuals is overcome, and in the personal spiritual life of individuals divine and human nature are united. This is the most speculative interpretation we have of the old dogmatic notion of redemption, which from its original character as a single isolated phenomenon of history has here become the constant activity of a Christian principle, and an ever-living precedent of Christian life.

It would be a prolix and wearisome task to go through in this way the whole dogmatism of this speculative theology. The fundamental ideas which we have discussed will suffice to show the manner in which, on the one hand, it spiritualised the allegorical notions of popular Christianity, but on the other left untouched the gist of the religious view and the dramatical or dualistic opposition of the divine and human. The notions of grace and sanctification, the notion of the church as a living, organised instrument of salvation, spring directly and logically from these fundamental ideas.

In the province of ethics this movement has a much easier task than the churches based on the New Testament. As it seeks to establish, not a primitive Christianity, but a modernised Christianity developed in the spirit of recent times, there is no necessity of its being incommoded by the ethical crudenesses of early Christianity, but it is in the same position to work these crude nessesover critically as it did the asperities of the old dogmas. It can assimilate most of what it needs from modern philosophical ethics, and content itself with giving to what it has thus borrowed a metaphysically religious background derived from dogmatic traditions.

That this modern gnosis is in a constant state of vacillation with respect to the practical things of life, is a necessary consequence of its fundamental assumptions and of its position towards the doctrines of the church. Its foremost representatives acknowledge without any reserve that the true source from which religious emotions and sentiments flow is the symbolic or imaginative faculty of

man. The grandly simple pictures in which the ancient Christian faith found satisfaction are now in the course of time inevitably disintegrated by the critical reason. The speculative theology itself proclaims that its vocation is one of coöperation towards this end. But it maintains nevertheless that the fruits of this work, the speculative interpretation of the dogmas, their exaltation into the sphere of the Idea, are fit only for initiated minds, and are caviare for the general. The general, the people, want and will use religion in the form which its fancy has created, and it cannot be revealed to it in any other. Progressive in its theories, this gnosis is in its ecclesiastical practice thoroughly conservative. It thinks two kinds of thought, and speaks two kinds of languages, according as it finds itself in the pulpit or in the professorial chair. And it is in just this procedure that it assumes a position which it is very difficult to attack. He, who working for a sound and progressive popular enlightenment on the ground of a unitary view of the world, opposes the further use of the antiquated and effete allegories of the old religions, is told that he is behind the times, and that religion, nurtured by the spirit of modern science, has become something different from what it formerly was. In very strict ecclesiastical quarters this gnosis is looked at askance, and accused of insincerity, nay, of secret alliance with unbelief; but the movement never allowed itself to be led astray by these accusations, and has never failed to assert its right of coöperation in the common work of the Christian church. For though it pretends to be in the hands of the thinking theologian a means of bringing into harmony the faith which he must confess and the thought which he cannot abandon, it yet admits, that with the majority of mankind the allegory will always remain an essential element of religion, and that therefore the task of scientific theology can never be to destroy these vessels of religion, but only to exercise a watchful care, that with the form the spirit also may not be lost.

III.

The question now arises,—and this brings us back to the considerations of the first part of this essay,—Does this rationalised

THE RELIGION OF SCIENCE.

ARE religion and science indeed as contrary as they are often represented to be, and is the proposition to reconcile them a hopeless and futile undertaking? Professor Jodl, in his article "Religion and Modern Science," (pp. 329–351 of this number,) says:

"That civilised humanity to-day is separated into two groups which no longer understand each other, which do not speak the same language, and which live in totally different worlds of thought and sentiment."

There are those who cling to the old religions and those who supplant it by a new idealism. Between both, he adds:

"A third class stands which plays the part of a mediator."

Professor Jodl does not approve of reconciling the historical forms of religion with science. He rightly says:

"The 'pure doctrine of Christ,' the genuine, primitive form of Christianity, is a Utopia of biblical criticism."

We heartily agree with him in his remarks concerning the part which the miraculous and supernatural play in the Gospels:

"These things are so intimately interwoven with the modes of thought of the synoptic writers that it is impossible to separate them therefrom without doing violence to the internal connection of their doctrines."

We also concur upon the whole with Professor Jodl in his criticism of the methods of Speculative Theology. No compromising with traditional errors, no covering or extenuating of the results of historical criticism is allowable merely for the love of tradition and for the preservation of errors that have become dear to a large number of people.

We do not condemn the work of any mediator; on the contrary, we rather encourage it. We observe with pleasure in the latest phases of the religious evolution of Speculative Theology the prevalence of a more modern spirit, and we follow with a keen interest also the progress of biblical critique in its truly valuable labors: but we do not expect that either the one or the other will accomplish any regeneration of religion.

Professor Jodl knows very well that the editors of *The Monist* and *The Open Court* have not undertaken any work of compromising between the errors of the past and the ideal of the future. Our idea of a reconciliation between religion and science is of a different nature. We are not blind to the errors of the old religions, and we do not mean to gloss them over, or to make old-fashioned views acceptable by presenting them in a new garment. We do not even stop to bury the dead, for we have better things to do than to trouble with problems that have been definitely settled. We keep our hands to the plough to accomplish the work needed to-day.

While we are not blind to the errors of the old religions, we recognise at the same time that they contain in the language of parables some great truths which will remain forever. These truths constitute the backbone of religion, and we regard it as a very important duty of ours to preserve them. These truths must be preserved, not because they were believed in by our fathers, nor from any respect for tradition, nor from any regard for our sentiments, but simply because they are truths, because they can be proved to be true according to the methods of scientific inquiry.

What is religion? Religion consists of all those ideas which regulate our conduct. In the savage these ideas are very crude and superstitious, and often self-contradictory. The higher a man rises, the clearer, the more scientific and consistent do these ideas become, until they develop into a systematic world-conception. Every scientific idea that changes our world-conception will change also our religion and with it our rules of conduct. Thus, for example, the idea of evolution has become to us an eminently religious idea.

In order to indicate that the criterion of truth for religion is the very same thing as the criterion of truth for science, we have pro-

posed to call the religion we advocate, "The Religion of Science." (For details see the editorial of Vol. VII, No. 1, of *The Open Court.*)

Our procedure appears to many as an annihilation of religion in favor of science. But it is not. And why not?

We have learned many truths first from religion, long before science could ever think of proving them. In several respects science took the lead, and religion remained at a long distance behind, awkwardly, very slowly, and unwillingly limping onward on the road of progress. Instances are, the acceptance of the Copernican system and of the evolution theory. But in other respects religion took the lead, and science was unable to follow its ingenious flight. As instances of this we cite such moral truths as the love of enemies, which were not preached by scientists as scientific truths, but by religious teachers, by Confucius, Buddha, and Christ. There are scientists even to-day who regard what we would call "moral truths" as maxims that are contrary to the established views o science. Professor Huxley, for instance, is very emphatic in his declaration that the facts of nature do not teach morality.*

This leads us to a point in which we disagree with Professor Jodl. He speaks of the illusion "of mingling together in the idea of God two wholly distinct ideas—the ideas namely of nature and of an ethical ideal"—an illusion to which "even strict monistic thinkers like Spinoza fell victims."

Professor Jodl's position reminds us of John Stuart Mill's "Essay on Nature," in which he exposes the old doctrine *naturam sequi* in all its absurd meanings and carefully avoids a discussion of the only rational conception of the precept. Thus his tirades appear most convincing, and to be sure they are quite correct—so far as they go. Says Mill:

"In sober truth, nearly all the things which men are hanged or imprisoned for doing to one another, are nature's every-day performances. Killing, the most criminal act recognised by human laws, Nature does once to every being that lives. . .

"Nature impales men, breaks them as if on the wheel, casts them to be devoured by wild beasts, burns them to death, crushes them with stones like the first Christian martyr, starves them with hunger, freezes them with cold, poisons them

* For a discussion of this point see *Fundamental Problems*, pp. 219–226.

by the quick or slow venom of her exhalations, and has hundreds of other hideous deaths in reserve, such as the ingenious cruelty of a Nabis or a Domitian never surpassed."

Mill must indeed have felt the need of beginning these sentences with the words "In sober truth"; otherwise he might be suspected of humor.

Similarly comical is Mill's proposition to regard every voluntary action of man as a direct infringement upon nature. Man's reason in that case would be the most unnatural phenomenon in the world, and the term "nature" would be confined to the lowest realms of existence exclusively. If the usage of reason were indeed an infringement upon nature, man's appearance upon earth would mark the beginning of a supernatural realm; and Professor Jodl seems to accept this consequence when he says:

"It is not *of* nature, it is *above* nature."

If man's rationality and his ethics were not born of nature, if their conditions were not founded in the very existence of nature, if they were not the natural product of evolution, then indeed I see no escape from a dualistic world-conception, in which a supernatural God introduces the spark of divinity which appears in the soul of man from spheres beyond.

We have devoted to these vagaries of John Stuart Mill an elaborate discussion in another place and do not feel the need of repeating our arguments in this connection.*

We agree with Professor Jodl that no rationalising of old dogmas will help us in the establishment of "a new idealism, formed in harmony with the spirit of science." We must build our religion anew (as every generation had to build its religion anew) out of the best materials which are furnished by the maturest and most reliable knowledge of to-day. Says Professor Jodl:

"Through *us* something has come into the world that before us did not exist—something that the most exuberant creative magic, or nature's grandest mechanical

* See the article in Nos. 239, 241, and 242 of *The Open Court: Nature and Morality.* An Examination of the Ethical Views of John Stuart Mill. I. The Meaning of Basing Ethics Upon Nature. II. The Ethics Taught by Nature. III. Intelligent Action and Moral Action. IV. The Anthropomorphic Standpoint of Mill.

dreams, could never replace. The day on which first a human being pressed his weaker fellow-man to his breast and said, "Brother, not mine, but thy will be done; I will give up my desires that thou also mayst be glad"; the day upon which man first lifted up his head and said, "Let us make the world *good* in the likeness of the picture that has become living in us, just as it should be"; this is the great and sanctified day in the history of our race on earth, the Christmas day on which God was born."

Certainly the origin of man on earth, and again the evolution of the moral man, is something quite new, which before did not exist. But did humanity originate out of nothing, as sometimes the imaginations of a poet are supposed to be created, or is there a prototype in whose image man has been created? Man's reason, his ethics, and his humanity are something that did not exist before, but there is a feature in existence which makes it possible that rational and moral beings develop. Should there be sentient beings on other planets, and we have little reason to doubt it, we can be sure that they also will develop rational minds, and that they also will learn, perhaps as we did, through many bitter experiences, the same truths which constitute our main maxims of morality,* including such precepts as the love of enemies. And why are we sure that on other planets not only reason, but also the fundamental rules of ethics will be the same as with us here on earth? Simply because we know that there is a certain feature in reality which creates rational beings and moral beings as naturally as it creates rocks and seas on the surface of planets. Man's reason and also man's morality are not original inventions of his, but the result of many experiences which he had to learn. And the world in which he lives is such that he can acquire reason and morality, and if a being should acquire a wrong kind of reason or a wrong kind of morality, it will by and by be blotted out of existence. Accordingly there is a prototype of reason and of morality, and this prototype of the humanity of man is exactly that which in the language of the old religions has received the name "God."

* I purposely do not say *all* maxims of conduct, because we can very well imagine that different conditions may produce some very important variations in the rules of conduct; but the main foundation of morality would be the same.

We must make a distinction between ideals and dreams. Those creations of our fancy which are woven without any regard to reality are dreams. They have no value beyond whiling away a leisure hour or pleasing our imagination. But those creations of our mind which construct realisable formations such as machines or clocks or higher conditions of human society, are not mere dreams, they are ideals. What, then, is the difference between a dream and an ideal? A dream is a useless ebullition of an idle brain composed of ideas to which there is no correspondent reality; but an ideal is a potent factor in the living presence to shape the future: it is a combination of ideas which are correct descriptions of actual realities. The moral aspirations of mankind are not empty dreams, they are true and veritable ideals. There are certain qualities in nature which make their realisation possible and these qualities constitute the Divinity of nature.

Professor Jodl speaks of the origin of morality as of the birth of God on earth. Truly that is the meaning of Christianity. But this birth of God into the world of human evolution as "the Son of Man" is possible only because of the existence of the God in nature whom Christian mythology so beautifully calls God the Father. The appearance of the Son of Man upon earth, the birth of morality, is a revelation of the divinity of nature.

True enough, as Professor Jodl says, that we ourselves won the best and highest we have by hard struggles, by terribly severe, self-imposed discipline. As Prometheus says:

"Hast du nicht alles selbst vollendet,
Heilig glühend Herz!"

That, too, is part of the divinity of nature, that every creature has to work out its very being itself, and that man must search for the way of salvation with great anxiety, under bitter tribulations and through extreme afflictions. But he cannot invent a new way of salvation, he has to find it, and there is but one that is the right one. The nature of morality is such as it is, and no other morality could be invented to replace it. And this feature of existence which makes morality quite a determined thing is a real presence in the world, it is an actual quality of the universe.

Some of our liberal friends, foremost among them Professor Haeckel, deny the existence of a personal God and then proceed to declare that the God of science is nothing but matter and energy. We agree with Professor Haeckel in his rejection of anthropotheism; God is no supernatural being nor is he a huge world-ego. But we cannot accept his view of God as being only matter and energy. The idea of God is and always has been a moral idea. Thus we have come to regard all those features of nature as divine which condition the origin and existence of morality and we define God as the authority of moral conduct. This authority is not a person, not a sentient being, let alone a sentimental philanthropist; but it is, nevertheless, a reality, and, indeed, a stern reality.

Such is the God of science. God is that quality of existence through which we originated as feeling, thinking, and aspiring beings. He is the prototype of the human soul, and the condition under which develop man's reason and morality. Obedience to him is indispensable for a continued existence, for further progress and a higher evolution of the human soul. That these features of reality can by a great number of keen and fearless modern thinkers be supposed to be a non-entity is difficult to understand. This negation of the reality of qualities of existence which are not individual things but intrinsically inherent in all the individual things, it appears to us, is an old heirloom of nominalism. The nominalistic philosophy represented by Roscellinus was suppressed at the council at Soissons 1092, only to rise more powerfully in the fourteenth century in William of Occam, and finally to exterminate realism with all its rubbish of errors together with the truth contained in these errors. Kant marks in many respects the culmination of the victorious movement of nominalism. With all the benefits modern thought derived from the philosophical work of nominalism, a reaction is needed against its purely negative spirit. There is a truth in the old realism which cannot be neglected with impunity.*

* There are two men at present who boldly fly the flag of the old realism again, both having our full sympathy in their aspirations, although we cannot agree with many of their teachings. The one is Mr. Charles S. Peirce, the other Dr. Francis E. Abbot.

God (viz., the name of God) is, as Kant said, a noumenon, a thing of thought, an abstraction. God is not a thing, a concrete object, or an individual person. All the views of God which regard him as an individual being of some kind, or as a person only of infinite dimensions, are, closely considered, pagan notions which belittle God. But the name of God as a noumenon, a thought, an abstract idea, has a meaning. Abstract ideas are not nonentities they represent some real features, some actual qualities, or properties, or relations ; otherwise they would not be ideas, but unmeaning sounds.

Some of our abstract ideas are of a very delicate fibre, so that the coarse mental vision of the average Philistine is unable to see them in their reality and potency. But it so happens that exactly they are of a more important, more powerful, and inevitable presence than the simple generalisations of things that visibly and corporeally surround us. This, their peculiar nature, makes such ideas mysterious to those who instinctively feel their reality without being able to point it out and understand it. And the most subtle, imponderous, and sublimated of all ideas is the idea of God.

We have defined God as the ultimate authority of conduct, as the condition of our existence as rational and moral beings, as the all-power that enforces obedience, etc.; but we cannot in any one of our definitions exhaust the significance of the idea. We would by no means exclude from the idea of God anything without which reality would cease to be real. The qualities of matter and energy constitute that element in the God-idea which justify the old religions in speaking of him as omnipotent and everlasting. Thus they ought not to be excluded. But these qualities alone are insufficient to characterise his being. The sum-total of matter and energy as such and as such alone does not constitute any moral authority. Nature in her immeasurable greatness and oppressive vastness affects us with awe ; but, after all, we look down upon her massive sublimity. Man is more than the biggest heap of crude matter and unintelligently operating energy. Says Professor Jodl :

"We stand amazed at her might and greatness, at the plentitude of her powers of creation, at her myriad play of forces, at the inexhaustible wealth of the relations

with which she binds being to being, creates and mediates contrarieties, and amidst the most varied change and alternation, ever remains one and the same! But our prototype, our God, she can never be."

This grandeur of nature is part of her divinity, but it alone does not constitute the character of God. Yet, observe that throughout nature there is an imponderable quality present which makes every atom move in a definite way, so that the whirl of gaseous masses, apparently a chaos, will be recognised as a cosmic whole developing in a certain way and describable in what is generally called natural laws. This subtle quality is the condition of the regularities which are found in all the infinite varieties and innumerable particularities, and all these regularities conceived in their systematic unity are called the order of the universe.

Man exists as a thinking being only because the immeasurable universe of which he is a part possesses this quality of order, and his reason is closely considered only a copy of it. Man's reason was shaped into the image of the cosmic order, and suppose—a supposition which is very difficult to make and regarded by many as impossible or inconceivable—yet suppose that the world-order were radically different from what it actually is, man's reason would accordingly be different too. Further, suppose that the whole frame and fundamental interrelations of the particles of reality were different from what they are, would not correspondingly the basic rules of conduct be changed too?

The author of this article, in the eyes of the so-called orthodox Christian, is most certainly an atheist. And if theism means the belief in a personal or extramundane God he is an atheist indeed. If there is any opprobrium in the name atheism we are willing to accept it; and certainly, we do not reject the label of atheism in order to escape any odium attached to that name. We do reject atheism simply because we see a great and potent truth in the idea of God which is but too often disregarded.

With Professor Haeckel and Professor Jodl we reject the conception of an anthropomorphic Deity. The anthropomorphic idol is doomed before the tribunal of science. But we see a deeper meaning in the idea of God which has formed through millenniums the

entre of the greatest religions on earth. Science has to recog-
e reality of an all-presence in existence which is analogous to
hich in a religious language is called God.

onsidering the fact that humanity owes many great truths to
n, let us not be hasty in condemning the religions of the past
e superstition. There are valuable seeds in the chaff. If we
d the wheat together with the tares, we shall have to redis-
them, for it is little probable that humanity can for any length
e be satisfied with beautiful phrases or live in its moral aspira-
in a realm of mere dreams.

EDITOR.

THE SUPERSTITION OF NECESSITY.*

LEST my title give such offense as to prejudice unduly my contention, I may say that I use the term in the way indicated by its etymology: as a standing-still on the part of thought; a clinging to old ideas after those ideas have lost their use, and hence, like all superstitions, have become obstructions. For I shall try to show that the doctrine of necessity is a survival; that it holds over from an earlier and undeveloped period of knowledge; that as a means of getting out of and beyond that stage it had a certain value, but, having done its work, loses its significance. Halting judgment may, indeed, at one time have helped itself out of the slough of uncertainty, vagueness, and inadequacy on to ground of more solid and complete fact, by the use of necessity as a crutch; once upon the ground, the crutch makes progress slower and, preventing the full exercise of the natural means of locomotion, tends to paralyse science. The former support has become a burden, almost an intolerable one.

The beginning of wisdom in the matter of necessity is, I conceive, in realising that it is a term which has bearing or relevancy only with reference to the development of judgment, not with reference to objective things or events. I do not mean by this that necessity refers to the compelling force with which we are driven to make a given affirmation: I mean that it refers to the content of that affirmation,

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* This article, as the title may indicate, was suggested by Mr. Peirce's article upon "The Doctrine of Necessity Examined." As, however, my thought takes finally a different turn, I have deemed it better to let it run its own course from the start, and so have not referred, except indirectly, to Mr. Peirce's argument. I hope this will not be taken as a desire to slur over my indebtedness to him.

expressing the degree of coherence between its constituent factors. When we say something or other *must* be so and so, the "must" does not indicate anything in the nature of the fact itself, but a trait in our *judgment* of that fact; it indicates the degree with which we have succeeded in making a whole out of the various elements which have to be taken into account in forming the judgment. More specifically, it indicates a half-way stage. At one extreme we have two separate judgments, which, so far as consciousness is concerned, have nothing to do with each other; and at the other extreme we have one judgment into which the contents of the two former judgments have been so thoroughly organised as to lose all semblance of separateness. Necessity, as the middle term, is the midwife which, from the dying isolation of judgments, delivers the unified judgment just coming into life—it being understood that the separateness of the original judgments is not as yet quite negated, nor the unity of the coming judgment quite attained. The judgment of necessity, in other words, is exactly and solely the transition in our knowledge from unconnected judgments to a more comprehensive synthesis. Its value is just the value of this transition; as negating the old partial and isolated judgments—in its backward look—necessity has meaning; in its forward look—with reference to the resulting completely organised subject-matter—it is itself as false as the isolated judgments which it replaces. Its value is in what it rids judgment of. When it has succeeded, its value is nil. Like any go-between, its service consists in rendering itself uncalled for.

All science can ultimately do is to report or describe, to completely state, the reality. So far as we reach this standpoint regarding any fact or group of facts, we do not say that the fact *must* be such and such, but simply that it *is* such and such. There is no necessity attaching to the fact either as whole or as parts. *Qua* whole, the fact simply is what it is; while the parts, instead of being necessitated either by one another or by the whole, are the analysed factors constituting, in their complete circuit, the whole. In stating the whole, we, as of course, state all that enters into it; if we speak of the various elements as *making* the whole, it is only in the sense of making it *up*, not of causing it. The fallacy of the ne-

cessitarian theory consists in transforming the determinate in the sense of the wholly defined, into the determined in the sense of something externally made to be what it is.

The whole, although first in the order of reality, is last in the order of knowledge. The complete statement of the whole is the goal, not the beginning of wisdom. We begin, therefore, with fragments, which are taken for wholes; and it is only by piecing together these fragments, and by the transformation of them involved in this combination, that we arrive at the real fact. There comes a stage at which the recognition of the unity begins to dawn upon us, and yet, the tradition of the many distinct wholes survives; judgment has to combine these two contradictory conceptions; it does so by the theory that the dawning unity is an effect necessarily produced by the interaction of the former wholes. Only as the consciousness of the unity grows still more is it seen that instead of a group of independent facts, held together by "necessary" ties, there is one reality, of which we have been apprehending various fragments in succession and attributing to them a spurious wholeness and independence. We learn (but only at the end) that instead of discovering and then connecting together a number of separate realities, we have been engaged in the progressive definition of one fact.

There are certain points upon which there is now *practical* agreement among all schools. What one school has got at by a logical analysis of science, another school has arrived at by the road of a psychological analysis of experience. What one school calls the unity of thought and reality, another school calls the relativity of knowledge. The metaphysical interpretation further given to these respective statements may be quite different, but, so far as they go, they come to the same thing: that objects, *as known*, are not independent of the process of knowing, but are the content of our judgments. One school, indeed, may conceive of judgment as a mere associative or habitual grouping of sensations, the other as the correlative diversification and synthesis of the self; but the practical outcome, that the "object" (anyway as known) is a form of judgment, is the same. This point being held in common, both schools must agree that *the progress of judgment is equivalent to a change in*

the value of objects—that objects as they are for us, as known, change with the development of our judgments. If this be so, truth, however it be metaphysically defined, must attach to late rather than to early judgments.

I am fortunate in being able to quote from authors, who may be taken as typical of the two schools. Says Professor Caird in his article upon "Metaphysic," (lately reprinted, "Essays in Philosophy and Literature,"):

"Our first consciousness of things is not an immovable foundation upon which science may build, but rather a hypothetical and self-contradictory starting-point of investigation, which becomes changed and transformed as we advance." ("Essays," Vol. II, p. 398.)

On the other hand, Mr. Venn writes (in the first chapter of his "Empirical Logic"):

"Select what object we please—the most apparently simple in itself, and the most definitely parted off from others that we can discover—yet we shall find ourselves constrained to admit that a considerable mental process has been passed through before that object could be recognised as being an object, that is, as possessing some degree of unity and as requiring to be distinguished from other such unities."

He goes on to illustrate by such an apparently fixed and given object as the sun, pointing out how its unity as a persistent thing involves a continued synthesis of elements very diverse in time and space, and an analysis, a selection, from other elements in very close physical juxtaposition. He goes on to raise the question whether a dog, for example, may be said to "see" a rainbow at all, because of the complex analysis and synthesis involved in such an object. The "mental whole" (to use Mr. Venn's words, the "ideal unity" as others might term it) is so extensive and intricate that

"One might almost as reasonably expect the dog to 'see' the progress of democracy in the place where he lives, of which course of events the ultimate sensible constituents are accessible to his observation precisely as they are to ours."

As Mr. Venn is not discussing just the same point which I have raised, he does not refer to the partial and tentative character of our first judgments—our first objects. It is clear enough, however, that there will be all degrees between total failure to analyse and com-

bine (as, say, in the case of the dog and rainbow) and fairly adequate grouping. The difference between the savage whose synthesis is so limited in scope that he sets up a new sun every day and the scientific man whose object is a unity comprehending differences through thousands of years of time and interactions going on through millions of miles of space is a case in point. The distinction between the respective objects is not simply a superimposition of new qualities upon an old object, that old object remaining the same; it is not getting new objects; it is a continual qualitative reconstruction of the object itself. This fact, which is the matter under consideration, is well stated by Mr. Venn, when he goes on to say:

"The act of predication, in its two-fold aspect of affirmation and denial, really is a process by which we are not only enabled to add to our information *about* objects, *but is also the process by the continued performance of which the objects had been originally acquired, or rather produced*" (italics are mine).

This statement cannot be admitted at all without recognising that the first judgments do not make the object once for all, but that the continued process of judging is a continued process of "producing" the object.

Of course the confused and hypothetical character of our first objects does not force itself upon us when we are still engaged in constructing them. On the contrary, it is only when the original subject-matter has been overloaded with various and opposing predicates that we think of doubting the correctness of our first judgments, of putting our first objects under suspicion. At the start, these objects assert themselves as the baldest and solidest of hard facts. The dogmatic and naïve quality of the original judgment is in exact proportion to its crudeness and inadequacy. The objects which are the content of these judgments thus come to be identified with reality *par excellence*; they are *facts*, however doubtful everything else. They hang on obstinately. New judgments, instead of being regarded as better definitions of the actual fact and hence as displacing the prior object, are tacked on to the old as best they may be. Unless the contradiction is too flagrant, the new predicates are set side by side with the old as simply additional information; they do not react into the former qualities. If the contradiction is

too obvious to be overlooked the new predicate is used, if possible, to constitute another object, independent of the former. So the savage, having to deal with the apparently incompatible predicates of light and darkness, makes two objects; two suns, for two successive days. Once the Ptolemaic conception is well rooted, cycles and epicycles, almost without end, are superadded, rather than reconstruct the original object. Here, then, is our starting point: when qualities arise so incompatible with the object already formed that they cannot be referred to that object, it is easier to form a new object on their basis than it is to doubt the correctness of the old, involving as that does the surrender of the *object* (the fact, seemingly) and the formation of another object.

It is easier, I say, for there is no doubt that the reluctance of the mind to give up an object once made lies deep in its economies. I shall have occasion hereafter to point out the teleological character of the notions of necessity and chance, but I wish here to call attention to the fact that the forming of a number of distinct objects has its origin in practical needs of our nature. The analysis and synthesis which is first made is that of most practical importance; what is abstracted from the complex net-work of reality is some net outcome, some result which is of value for life. As Venn says:

"What the savage mostly wants to do is to produce something or to avert something, not to account for a thing which has already happened. What interests him is to know how to kill somebody, not to know how somebody has been killed." (P. 62 of "Empirical Logic.")

And again:

"What not only the savage, but also the practical man mostly wants, is a *general* result, say the death of his enemy. It does not matter whether the symptoms, i. e., the qualifying circumstances, are those attendant on poison, or a blow from a club, or on incantation, provided the death is brought about. But they do desire *certainty* in respect of this general result." (P. 64.)

Now it is this "general result," the net outcome for practical purposes, which is *the* fact, *the* object at first. Anything else is useless subtlety. That the man is dead—that is the fact; anything further is at most external circumstances which happen to accompany the fact. That the death is only a bare fraction of a fact; that

the attendant "circumstances" are as much constituent factors of the real fact as the mere "death" itself (probably more so from the scientific point of view)—all this is foreign to conception. We pluck the fruit, and that fruit is the fact. Only when practical experience forces upon us the recognition that we cannot get the fruit without heeding certain other "conditions" do we consent to return upon our assumed object, put it under suspicion and question whether it is really what we took it to be. It is, we may presume, the savage who in order to get his living, has to regulate his conduct for long periods, through changes of seasons, in some continuous mode, who first makes the synthesis of one sun going through a recurring cycle of changes—the year.

As time goes on, the series of independent and isolated objects passes through a gradual change. Just as the recognition of incompatible qualities has led to setting up of separate things, so the growing recognition of similar qualities in these disparate objects begins to pull them together again. Some relation between the two objects is perceived; it is seen that neither object is just what it is in its isolation, but owes some of its meaning to the other objects. While in reality, (as I hope later to point out,) this "relationship" and mutual dependence means membership in a common whole, contribution to one and the same activity, a midway stage intervenes before this one fact, including as parts of itself the hitherto separate objects, comes to consciousness. The tradition of isolation is too strong to give way at the first suggestion of community. This passage-way from isolation to unity, denying the former but not admitting the latter, is necessity or determinism. The wall of partition between the two separate "objects" cannot be broken at one attack; they have to be worn away by the attrition arising from their slow movement into one another. It is the "necessary" influence which one exerts upon the other that finally rubs away the separateness and leaves them revealed as elements of one unified whole. This done, the determining influence has gone too.

The process may be symbolised as follows: M is the object, the original synthesis of the elements seen to be of practical importance; a, b, c, etc., to h are predicates of constantly growing incompatibil-

ity. When the quality *i* is discovered, it is so manifestly incompatible with *a* that all attempt to refer it to the same subject *M* is resisted. Two alternatives are now logically open. The subject-matter *M*, as the synthesis of the qualities *a*—*h*, may be taken up; it may be asked whether the object is really *M* with these qualities; whether it is not rather Σ, having instead of the predicates *a*, *b*, etc., the qualities $\rho\alpha$, $\rho\beta$, with which the new quality *i* is quite compatible. But this process goes against the practical grain of our knowledge; it means not only that we do not know what we thought we knew; it means that we did not *do* what we thought we did. Such unsettling of action is hardly to be borne. It is easier to erect a new object *N*, to which the more incompatible predicates are referred. Finally, it is discovered that both *M* and *N* have the same predicates *r* and *s*; that in virtue of this community of qualities there is a certain like element even in the qualities previously considered disparate. This mutual attraction continues until it becomes so marked a feature of the case that there is no alternative but to suppose that the *r* and *s* of one produces these qualities in the other, and thereby influences all the qualities of the other. This drawing together continues until we have the one reconstructed object Σ, with the traits $\rho\alpha$, $\rho\beta r$, etc. It is found that there is one somewhat comprehensive synthesis which includes within itself the several separate objects so far produced; and it is found that this inclusion in the larger whole reacts into the meaning of the several constituting parts—as parts of one whole, they lose traits which they seemed to possess in their isolation, and gain new traits, because of their membership in the same whole.

We have now to consider, more in detail, how the intermediate idea of necessity grows up and how it gives away upon the discovery of the one inclusive whole. Let us continue the illustration of the killing. The "general result," the death of the hated enemy, is at first the fact; all else is mere accidental circumstance. Indeed, the other circumstances at first are hardly that; they do not attract attention, having no importance. Not only the savage, but also the common-sense man of to-day, I conceive, would say that any attempt to extend the definition of the "fact" beyond the mere

occurrence of the death is metaphysical refinement; that the *fact* is the killing, the death, and that that "fact" remains quite the same, however it is brought about. What has been done, in other words, is to abstract part of the real fact, part of *this* death, and set up the trait or universal thus abstracted as itself *fact*, and not only as fact, but as *the* fact, *par excellence*, with reference to which all the factors which constitute the reality, the concrete fact, of *this* death, are circumstantial and "accidental."*

A fragment of the whole reality, of the actual fact individualised and specified with all kind of minute detail, having been thus hypostatised into an object, the idea of necessity is in fair way to arise. These deaths in general do not occur. Although the mere death of the man, his removal from the face of the earth, is the *fact*, none the less all *actual* deaths have a certain amount of detail in them. The savage has to hit his enemy with a club or spear, or perform a magic incantation, before he can attain that all-important end of getting rid of him. Moreover, a man with a coat of armor on will not die just the same way as the man who is defenseless. These circumstances have to be taken into account. Now, if the "fact" had not been so rigidly identified with the bare practical outcome, the removal of the hated one, a coherent interpretation of the need for these further incidents would be open. It could be admitted that the original death was a highly complex affair, involving a synthesis of a very large number of different factors; furthermore, the new

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* The reason of this abstraction is in practical nature, as already indicated. For all the savage *cares* about it, the death in general, *is* the real fact. It is all that interests him. It is hardly worth while to attempt to persuade the savage; indeed, if he were not only a savage, but also a philosopher, he might boldly challenge the objector to present *any* definition of object which should not refer objectivity to man's practical activity; although he might, as a shrewd savage, admit that some one activity (or self) to which the object is referred has more content than another. In this case, I, for one, should not care about entering the lists against the savage. But when the common-sense philosopher, who resists all attempts to reconstruct the original object on the ground that a fact is a fact and all beyond that is metaphysics, is also a case-hardened nominalist (as he generally is), it is time to protest. It might be true that the real object is always relative to the value of some action; but to erect this pure universal into the object, and then pride one's self on enlightenment in rejecting the "scholastic figment" of the reality of universals is a little too much.

cases of murder could be employed to reconstruct the original analysis-synthesis; to eliminate supposed factors which were not relevant, and to show the presence of factors at first not suspected. In other words, the real fact would be under constant process of definition, of "production." But the stiff-necked identification of the fragment, which happened to have practical importance with the real object, effectually prevents any such reaction and reconstruction. What is to be done, however, with these conditions of spear, of stone, of armor, which so obviously have something *to do* with the real fact, although, as it would seem, they are not the fact? They are considered as circumstances, *accidental*, so far as death in general is concerned; *necessary*, so far as *this* death is concerned. That is, wanting simply to get the net result of the removal of my enemy, so that he will no longer blight the fair face of nature, it is accidental how I do it; but having, after all, to kill a man of certain characteristics and surroundings in life, having to choose time and place, etc., it becomes necessary, *if* I am to succeed, that I kill him in a certain way, say, with poison, or a dynamite bomb. Thus we get our concrete, individual fact again.

Consider, then, that tortuous path from reality to reality, *via* a circuit of unreality, which calls the thought of necessity into existence. We first mutilate the actual fact by selecting some portion that appeals to our needs; we falsify, by erecting this fragment into the whole fact. Having the rest of the fact thus left on our hands for disposal, when we have no need of the concrete fact we consider it accidental, merely circumstantial; but we consider it necessary whenever we have occasion to descend from the outcome which we have abstracted back to the real fact, in all its individuality. Necessity is a device by which we both conceal from ourselves the unreal character of what we have called real, and also get rid of the practical evil consequences of hypostatising a fragment into an independent whole.

If the purely teleological character of necessity is not yet evident, I think the following considerations will serve to bring it out. The practical value, the fruit from the tree, we pick out and set up for the entire fact so far as our past action is concerned. But so far

as our *future* action is concerned, this value is a result *to be* reached; it is an end to be attained. Other factors, in reality all the time bound up in the one concrete fact or individual whole, have now to be brought in as means to get this end. Although after our desire has been met they have been eliminated as accidental, as irrelevant, yet when the experience is again desired their integral membership in the real fact has to be recognised. This is done under the guise of considering them as means which are necessary to bring about the end. Thus the idea of the circumstances as external to the "fact" is retained, while we get all the practical benefit of their being not external but elements of one and the same whole. Contingent and necessary are thus the correlative aspects of one and the same fact; conditions are accidental so far as we have abstracted a fragment and set it up as the whole; they are necessary the moment it is required to pass from this abstraction back to the concrete fact. Both are teleological in character—contingency referring to the separation of means from end, due to the fact that the end having been already reached the means have lost their value for us; necessity being the reference of means to an end *which has still to be got*. Necessary means *needed*; contingency means no longer required—because already enjoyed.

Note that the necessity of the means has reference to an end still to be attained, and in so far itself hypothetical or contingent, while the contingent circumstances are no longer needed precisely because they have resulted in a definite outcome (which, accordingly, is now a fact, and, in that sense, necessary) and we begin to see how completely necessity and chance are bound up with each other.

Their correlation may thus be stated: *If* we are to reach an end we *must* take certain means; while so far as we want an undefined end, an end in general, conditions which accompany it are mere accidents. Whichever way the relationship be stated, the underlying truth is that we are dealing with only partial phases of fact, which, having been unduly separated from each other through their erection into distinct wholes, have now to be brought back into their real unity.

In the first place, then, *if* I am to reach an end, certain means

must be used. Here the end is obviously postulated; save as it is begged (presupposed), the necessity of the means has no sense. If, when starving, I am to live I must steal a dinner, but, having stolen, the logical but unsympathetic judge may question the relevancy (that is, the necessity) of my end, and thus cut the ground out from under the necessity of my means. My end requires *its* justification, the establishing of its validity, before the necessity of the means is anything more than hypothetical. The proximate end must be referred to a more ultimate and inclusive end to get any solid ground. [Here we have our choice: we may deny the existence of any organic whole in life and keep chasing in a never-ending series, the *progressus ad infinitum*, after an end valid in itself. In this case we never get beyond a hypothetical necessity—something is necessary *if* we are to have something else, the necessity being relative to the implied doubt. Or, being convinced that life is a whole and not a series merely, we may say there is one comprehensive end which gives its own validity to the lesser ends in so far as they constitute it. While, on the other alternative, we reach only a hypothetical necessity, on this we reach none at all. The comprehensive end is no end at all in the sense of something by itself to be reached by means external to it. Any such end would be simply one in the infinite series and would be itself hypothetical. Whenever minor ends cease to be in turn means to further ends it is because they have become parts, constituent elements, of the higher end and thus ceased to be steps towards an end and beyond and outside of themselves. Given a final (i. e., inclusive) end, eating and drinking, study and gossip, play and business, cease to be means *towards* an end and become its concrete definition, its analytic content. The minor activities state the supreme activity in its specific factors.]

Our dilemma is the choice between an end which itself has no existence save upon presupposition of another end, (is contingent,) and an end which as an end in itself simply *is*.

The externality of means to end is merely a symptom of lack of specification or concreteness in the end itself. *If* I am going to invent some improvement in a type-writer, the necessity of going through certain preliminary steps is exactly proportionate to the in-

definiteness of my conception of what the improvement is to be; when the end is realised, the operations which enter into the realisation cease to be means necessary to an end and become the specific *content* of that end. The improvement is a *fact*, having such and such elements defining it. [If I simply want, in general, to get my mail I *must* take this path (there being but one road); but if my end is not thus general, if it is individualised with concrete filling, the walk to the office may become a part of the end, a part of the actual fact. In so far, of course, it loses all aspect of necessitation. It simply *is*.] And in general, so far as my end is vague, or abstract, so far as it is not specified as to its details, so far the filling up of its empty schema to give it particularity (and thus make it fact) appears as a means necessary to reach an end outside itself. The growth in concreteness of the end itself is transformed into ways of effecting an end already presupposed. Or, to state it in yet one other way, determination in the sense of definition in consciousness is hypostatised into determination in the sense of a physical making.

The point may come out more clearly if we consider it with the emphasis on chance instead of upon necessity. The usual statement that chance is relative to ignorance seems to me to convey the truth though not in the sense generally intended—viz., that if we knew more about the occurrence we should see it necessitated by its conditions. Chance is relative to ignorance in the sense rather that it refers to an indefiniteness in our conception of what we are doing. In our consciousness of our end (our acts) we are always making impossible abstractions; we break off certain phases of the act which are of chief interest to us, without any regard to whether the concrete conditions of action—that is, the deed in its whole definition—permits any such division. Then, when in our actual doing the circumstances to which we have not attended thrust themselves into consciousness—when, that is to say, the act appears in more of its own specific nature—we dispose of those events, foreign to our conscious purpose, as accidental; we did not want them or intend them—what more proof of their accidental character is needed? The falling of a stone upon a man's head as he walks under a window is "chance," for it has nothing to do with what the man proposed to

do, it is no part of his conception of that walk. To an enemy who takes that means of killing him, it is anything but an accident, being involved in *his* conscious purpose. It is "chance" when we throw a two and a six; for the concreteness of the act falls outside of the content of our intention. We intended *a* throw, some throw, and in so far the result is not accidental, but this special result, being irrelevant to our conception of what we were to do, in so far is contingent. The vagueness or lack of determinateness in our end, the irrelevancy of actual end to conscious intent, chance, are all names for the same thing. And if I am asked whether a gambler who has a hundred dollars upon the outcome does not *intend* to throw double sixes, I reply that he has no such intention—unless the dice are loaded. He may *hope* to make that throw, but he cannot intend it save as he can define that act—tell how to do it, tell, that is, just *what* the act is. Or, once more, if I intend to get my mail and there are four paths open to me it is chance which I take, just in proportion to the abstractness of my end. If I have not defined it beyond the mere "general result" of getting mail, anything else is extraneous and in so far contingent. If the end is individualised to the extent, say, of getting the mail in the shortest possible time, or with the maximum of pleasant surroundings, or with the maximum of healthy exercise, the indifferency of the "means," and with it their contingency, disappears. This or that path is no longer a mere means which *may* be taken to get a result foreign to its own value; the path is an intrinsic part of the end.

In so far as a man presents to himself an end in general, he sets up an abstraction so far lacking in detail as (taken *per se*) to exclude the possibility of realisation. In order to exist as concrete or individual (and of course, nothing can exist except as individual or concrete) it must be defined or particularised. But so far as consciousness is concerned the original vague end is *the* reality; it is all that the man cares about and hence constitutes his act. The further particularisation of the end, therefore, instead of appearing as what it really is, viz., the discovery of the actual reality, presents itself as something outside that end. This externality to the end previously realised in consciousness is, taken as mere externality, contingency,

or accident; taken as none the less so bound up with the desired end that it must be gone through before reaching that end, it is necessary. Chance, in other words, stands for the irrelevancy as the matter at first presents itself to consciousness; necessity is the required, but partial, negation of this irrelevancy. Let it be complete, instead of partial, and we have the one real activity defined throughout. With reference to this reality, conditions are neither accidental nor necessary, but simply constituting elements—they neither may be nor must be, but just are. What is irrelevant is now not simply indifferent; it is excluded, eliminated. What is relevant is no longer something required in order to get a result beyond itself; it is incorporated into the result, it is integral.

It now remains to connect the two parts of our discussion, the logical and the practical consideration of necessity, and show that, as suggested, logical necessity rests upon teleological—that, indeed, it is the teleological read backwards. The logical process of discovering and stating the reality of some event simply reverses the process which the mind goes through in setting up and realising an end. Instead of the killing of an enemy as something to be accomplished, we have the fact of a murder to be accounted for. Just as on the practical side, the end, as it first arises in consciousness, is an end in general and thus contrasts with the concrete end which is individualised; so the fact, as at first realised in consciousness, is a *bare* fact, and thus contrasts with the actual event with its complete particularisation. The actual fact, the murder as it really took place, is one thing; the fact as it stands in consciousness, the phases of the actual event which are picked out and put together, is another thing. The fact of knowledge, it is safe to say, is no *fact* at all; that is, if there had been in reality no more particularisation, no more of detail, than there is consciousness, the murder would never have happened. But just as, practically, we take the end in general to be the real thing, (since it is the only thing of any direct interest,) so in knowledge we take the bare fact as abstracted from the actual whole, as *the* fact. Just as the end of the savage is merely to kill his enemy, so the "fact" is merely the dead body with the weapon sticking in it. The fact, as it stands in con-

sciousness, is indeterminate and partial, but, since it is in consciousness by itself, it is taken as a whole and as the certain thing. But as the abstractness of the "end in general" is confessed in the fact that means are required in order to make it real—to give it existence—so the unreal character of the "fact" is revealed in the statement that the causes which produced it are unknown and have to be discovered. The bare fact thus becomes a result to be accounted for: in this conception the two sides are combined; the "fact" is at once given a certain reality of its own while at the same time the lack of concreteness is recognised in the reference to external causes.

The gradual introduction of further factors, under the guise of causes accounting for the effect, defines the original vague "fact," until, at last, when it is accounted for, we have before us the one and only concrete reality. This done, we no longer have an effect to be accounted for, and causes which produce it, but one fact whose statement or description is such and such. But intermediate between the isolation and the integration is the stage when necessity appears. We have advanced, we will suppose, from the bare fact of the murder to the discovery of a large amount of "circumstantial" evidence regarding that fact. We hear of a man who had a quarrel with the deceased; he cannot account for himself at the time when the murder *must* have been committed; he is found to have had a weapon like that with which the murder *must* have been committed. Finally we conclude he *must* have been the murderer. What do these "musts" (the "must" of the time, weapon, and murderer) mean? Are they not obviously the gradual filling-in of the previously empty judgment, through bringing things at first unconnected into relation with each other? The existence of the man M. N. is wholly isolated from the "fact" of the murder till it is learned that he had a grudge against the murdered man; this third fact, also distinct *per se*, brought into connection with the others (the "fact" of the murder and of the existence of M. N.) compels them to move together; the result is at first the possibility, later, as the points of connection get more and more marked and numerous, the "necessity," that M. N. is the murderer. Further, it is clear that this "must" marks not a greater certainty or actuality

than a mere "is" would indicate, but rather a doubt, a surmise or guess gradually gaining in certainty. When the fact is really made out to our satisfaction, we drop the "must" and fall back on the simple *is*. Only so long as there is room for doubt, and thus for argument do we state that the time and weapon must have been such and such. So when we finally conclude that the murderer must have been M. N., it means that we have woven a large number of facts, previously discrete, into such a state of inter-relationship that we do not see how to avoid denying their discreteness and incorporating them all into one concrete whole, or individual fact. That we still say "must" shows, however, that we have not quite succeeded in overcoming the partial and indefinite character of the original "fact." (Had we succeeded in getting the whole fact before us the judgment would take this form: The murder *is* a fact of such and such definite nature, having as its content such and such precise elements. In this comprehensive whole all distinction of effect to be accounted for and causes which produce clean disappears. The idea of necessity, in a word, comes in only while we are still engaged in correcting our original error, but have not surrendered it root and branch; this error being that the fragment of reality which we grasp is concrete enough to warrant the appellation "fact.")

A great deal of attention has been directed to the category of cause and effect. One striking feature of the ordinary consideration is, that it takes for granted the matter most needing investigation and aims the inquiry at the dependent member of the firm. The effect seems to be so clearly *there*, while the cause is so obviously something to be searched for that the category of effect is assumed, and it is supposed that only the idea of causation is in need of examination. And yet this abstraction of certain phases of fact, the erection of the parts thus abstracted into distinct entities, which, though distinct, are still dependent in their mode of existence, is precisely the point needing examination. It is but another instance of the supreme importance of our practical interests. The effect is the end, the practical outcome, which interests us; the search for causes is but the search for the means which would pro-

duce the result. We call it "means and end" when we set up a result to be reached in the future and set ourselves upon finding the causes which put the desired end in our hands; we call it "cause and effect" when the "result" is given, and the search for means is a regressive one. In either case the separation of one side from the other, of cause from effect, of means from end, has the same origin: a partial and vague idea of the whole fact, together with the habit of taking this part (because of its superior practical importance) for a whole, for a fact.

I hope now to have made good my original thesis: that the dea of necessity marks a certain stage in the development of judgment; that it refers to a residuum, in our judgments and thus in our objects, of indeterminateness or vagueness, which it replaces without wholly negating; that it is thus relative to "chance" or contingency; that its value consists wholly in the impulse given judgment towards the *is*, or the concrete reality defined throughout. The analysis has been long; the reader may have found it not only tedious, but seemingly superfluous, since, as he may be saying to himself, no one nowadays regards necessity as anything but a name for fixed uniformities in nature, and of this view of the case nothing has been said. I hope, however, that when we come to a consideration of necessity as equivalent to uniformity, it will be found that the course of this discussion has not been irrelevant, but the sure basis for going further.

JOHN DEWEY.

THE ISSUES OF "SYNECHISM."

IN a late number of *The Monist*, (Vol. II, No. 4,) there appears a singularly acute and profound article, from the pen of one of the ablest of American logicians and mathematicians, Mr. Charles S. Peirce. Its subject is "The Law of Mind"—the idea of continuity. The writer tells us, (p. 534,) "the tendency to regard continuity, in the sense in which I shall define it, as an idea of prime importance in philosophy, may conveniently be termed *Synechism*." With this *synechistic* philosophy, as applied to mind, the paper is occupied, to the exclusion, for the nonce, of Mr. Peirce's companion doctrine of *Tychism*,* which was dealt with, by him, in the January, 1891, and April, 1892, issues of *The Monist*. These conceptions are, both of them, to be viewed as essential to philosophy as a whole, but the latter is, for the present, allowed to drop out of sight, in order to allow of the due elaboration of the former.†

THE FORMULA OF SYNECHISM.

The formula of Synechism, with which the article begins, is as follows:

"Logical analysis applied to mental phenomena shows that there is but one law of mind, namely, that ideas tend to spread continuously, and to affect certain others which stand to them in a peculiar relation of affectibility. In this spreading they lose intensity, and especially the power of affecting others, but gain generality, and become welded with other ideas." (Vol. II, No. 4, p. 534.)

The individuality and continuity of ideas are, then, shown respectively to involve no contradiction; an idea once past—in the

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* From τύχη, chance.

† *Tychism* again comes to the front in the succeeding number of *The Monist*, (Vol. III, No. 1,) in an article by Mr. Peirce, entitled "Man's Glassy Essence."

sense of an event in an individual consciousness—is not wholly past, it is only going—"infinitesimally past, less past than any assignable past date." Thus the conclusion is reached that "the present is connected with the past by a series of real, infinitesimal steps." Again, "We are forced to say that we are immediately conscious through an infinitesimal interval of time. This is all that is requisite." (*Ibid.*, pp. 535–536.)

All that it is necessary to say at the outset is, that this view is supported by an elaborate inquiry into the nature of infinity and continuity in general, into which, for the purpose of the present paper, it is not needful to enter. And this for two reasons: (1) The synechistic philosophy, by itself, does not profess to be monistic. Its expounder does not, even if his Tychism were not in reserve, profess to carry it beyond the realm of mind, with all that is implied in such a reservation. Now, it is the bearing of Mr. Peirce's Synechism upon a monistic solution of the universe with which the present article is concerned. And (2) Mr. Peirce's method of treatment, though precise and logical in the direction of its own path, is too purely technical to be summarised for the general reader's benefit. But withal, Synechism is far too fertile, not so much in respect of what it makes clear, as suggestively, and, if the expression may be allowed, *obliquely*, to be passed over without comment. Its excogitator is eminently frank; he does not conceal the difficulties which, ever and anon, occur in his statement. Sometimes his theory seems a trifle too wide for the facts encountered, sometimes rather too scanty to contain them. Such phrases as the following: "No, I think we can only hold"—p. 552; "we are driven to perceive"—p. 555; "this obliges me to say"—p. 557; "the principle with which I set out requires me to maintain"—p. 558; "the only answer that I can, at present, make is"—p. 559, etc., etc., do every credit to the writer's candor, but they would scarcely occur in an exposition, which, in the mind of its author, made the rough places altogether plain. Synechism, even with Tychism in the background, probably does not, in Mr. Peirce's own mind, completely solve the world-riddle, at least, as yet. Still these very pauses themselves, on the part of a thinker of such ability, are eminently suggestive.

To use his own words: "the present paper is intended to show wha Synechism is, and what it leads to." Let us emphasise this latter clause, as likely to be more fruitful than the former.

MR. PEIRCE'S POSITIVISM.

Mr. Peirce, in spite of his theory of chance, is, in his Synechism, almost severely a positivist;* but his positivism, like most of that current nowadays, does not go deep enough. He is positivist, *after* he has got externality—fertile in excitations—comfortably disposed around his subject; and vibrations, undulations, attractions, etc., ready to play upon the thousand-stringed harp, *but not before*. For, "we must not tax introspection," he tells us, p. 548, "to make a phenomenon manifest, which essentially involves externality," when the real problem at issue is: Is there externality, in the vulgar sense, at all, or is it only that *rationalised externality* which *circumspection*, within the limits of egoity, reveals? Now, upon this a good deal hinges. At all events the difference in question, or, rather, that there *is* a difference, has been mooted, to say the least. And, this being the case, it is a little tedious, when the really vital point of the spatial extension of feelings is being debated, to have this illustration brought in, (p. 548,): "Moreover, our own feelings are focused in attention to such a degree, that we are not aware that ideas are not brought to an absolute unity. Just as nobody, not instructed by special experiment, has any idea how very, very little of the field of vision is distinct." Why, that is reasoning in a circle, if some systems are true; and it is a begging of the question, if they are the reverse.

If the system of so-called objective reality were, at sight, wholly veracious, if everything existed just as it seems, this positivism of Mr. Peirce's might be workable. Then no one would seek to go beneath the process of the apparent, the actually visible, for a *rationale*. But modern science teaches, in its very primer, that many things are, and act, quite otherwise than as they seem to be, and do. Appearances *rationalised* are alone to be accepted. The sun

* Dr. Carus, in his review of Mr. Peirce's doctrines, (*The Monist*, Vol. II, No. 4, p. 575,) notes this positivistic-constructionism.

does not "rise" and "set," as it seems to do. The earth is not, as it appears to be, an immovable plane, and so on. And, this once allowed, where is the principle to end? If the superficial judgment may be thus corrected, or reversed, it is liable to revision or reversal *ad infinitum*, unless reason be shown to the contrary. It may thus be disputed whether our author is quite in order in writing, as he does, and using the statement to support his theory—"Precisely how primary sensations, as colors and tones, are excited, we cannot tell, in the present state of psychology. . . . As far as sight and hearing are in question, we know that they are only excited by vibrations of inconceivable complexity; and the chemical senses are probably not more simple." (P. 557.)

To argue, we cannot tell precisely *how* they are excited, but we know that they *are* excited, is somewhat feminine; seeing that the said "excitement" is not patent on the surface of ordinary perception. And, this being the case, the excitement, or its mode rather, not being given immediately, but only mentally annexed, Mr. Peirce is not consistently positivist. It is equally open to an opponent to "annex" something else of his own to the "given" thing, or altogether to deny the necessity of anything whatever being thus annexed. In any case that (if anything) which is sought to be annexed must stand the test of positivism; we must know *if* such a thing is, and *what* it is precisely. And this is just what Mr. Peirce cannot do for us. He cannot tell us exactly what the "excitant" of feelings *is;* he can only guess what it is "*something like*," viz.: the feelings themselves. Hence the following:

"The principle with which I set out [that of continuity] requires me to maintain that these feelings are communicated to the nerves by continuity, *so that there must be something like them in the excitants themselves*. If this seems extravagant, it is to be remembered that it is the sole possible way of reaching any explanation of sensation, which otherwise must be pronounced a general fact absolutely inexplicable and ultimate. Now absolute inexplicability is a hypothesis which sound logic refuses, under any circumstances, to justify." (P. 558.—The italics are not in the original.)

There must be something like the feelings in the excitants of the feelings. Now, this point is worthy of the closest attention. Note that "the excitant" *alone* is mentioned. *Vibrations* excite sight

and hearing. Yet, from what follows, it is plain that Synechism is not inconsistent with belief in a fixed objective. "Even the least psychical of peripheral sensations, that of pressure, has, in its excitation, conditions which, though apparently simple, are seen to be complicated enough when we consider *the molecules and their attractions,*" pp. 557-558. Can there, then, be any doubt that we have to three distinct things: (1) a subjective, (2) an "excitant," and (3) an objective; the middle term being a vehicle of communication between the first and third? It does not affect this presentation of Mr. Peirce's position that, at an earlier stage of his argument, he speaks of matter—synonymous, presumably, with the objective—as being "not completely dead, but merely mind, hide-bound with habits," as "partially deadened" or "effete," mind; or that the editor of *The Monist* says that, with Mr. Peirce, "mind is the beginning of all." (*The Monist*, Vol. III, No. 1, p. 95.) The question, at present, is not regarding origins, but regarding co-existences. So that there is a distinct *hiatus* here, arising from the confusion of the stimulant, or excitant, of sensation with the objective itself.* Now, the stimulant of sensation is never the object perceived. Hence, once an objective is admitted, a trinity of entities is unavoidable, since still less can the "stimulant" be the subject. This special difficulty, in the present writer's opinion, is inseparable from dualism in every form. How it besets Mr. Peirce's theory is evident from his hazarded suggestion: "There must be *something like* the feelings in the excitants." He thus uses only two of his cosmical terms, and gives the third the go-by! All dualism halts, but surely there is here a palpable stumble.

In a recent article in *The Open Court*† I have pointed out the vanity of introducing a vehicle of communication between object and subject, especially emphasising the fact that, once this intermediate term is brought in, the veritable objective disappears. "Once you bring in vibrations," I remarked, "you practically provide a *second* object, which is really a part of the subject, and, in

* Cf. T. H. Green, *Prolegomena to Ethics*, Ch. II, p. 63.

† Nos. 258, 59, 61, August, 1892. *Miss Naden's World-Scheme.*

order to do this, you have taken from the original objective all that composed it."* (*The Open Court*, p. 3361.)

Is it any wonder, then, that Mr. Peirce should suppose the excitants to be "something like" the excited feelings? Since he, practically, surrenders the objective, what could more closely resemble the subjective than the subjective itself? If he had adopted the position of Hume, and made impressions and ideas all-in-all, his principle of continuity might hold. But this he does not do, since (1) he implicity admits the objective element, and (2) even if he did not do this, there must be something other than the idea or feeling in his system, since, otherwise, there could be no ground for the charge of seeming "extravagance," which, he admits, may be leveled against, at least one of, his conclusions.

FEELINGS SPATIALLY EXTENDED.

This leads us to Mr. Peirce's conclusions regarding subjective spatial extension—the spatial extension of feelings—as the result of observation of irritated protoplasm. Our attention is directed to an excited mass of protoplasm,—an amœba, or a slime-mould,—which "does not differ in any radical way from the contents of a nerve-cell, though its functions may be less specialised." (P. 547.) The irritation is induced when, say, the amœba is "quiescent and rigid," and we note its behaviour under it. That feeling passes from one part of this amorphous continuum of protoplasm to another, we are led to believe. And this conclusion follows: "Whatever there is in the whole phenomenon to make us think there is feeling in such a mass of protoplasm,—*feeling*, but plainly no *personality*,—goes logically to show that that feeling has a subjective, or substantial,

* In a note to this passage was appended a quotation from a pamphlet by Dr. E. Cobham Brewer as a practical instance of the objective being, on the antiquated subject-object plane, actually superseded. Suppose a very remote star to become extinct, the "vibrations" would continue to "travel" towards a spectator situated on our planet for years, it may be for centuries. So that the spectator, ultimately, "sees" that which does not even exist. Dr. Brewer's comment, which cannot be considered any contribution to a satisfactory *rationale*, is: "the objects, however, must have existed, or no messenger could have been sent from their courts." Evidently, in this case, that which is sent is, at least, as good as the sender—is, in fact, the self-same thing. Only, in that case, what of the extinct object?

spatial extension, as the excited state has." This is a chain of reasoning. Let us examine its links. We have:

(1) The behaviour of the amœba under immediate, mechanical irritation—the spread, or spatial extension, of the state of irritation.

(2) We are asked to identify this spread-out irritation, this field of excitation, with "feeling" on the part of the amœba, because there is "no doubt that it feels when it is excited."

(3) From the spatial extension of the irritation, thus identified with feeling, we are asked to conclude that the feeling, in the amœba, has a subjective, spatial extension as the excited state has, and, finally, passing from the feeling of the amœba to our own feelings, by inference, we are asked to admit:

(4) Not that we have necessarily a feeling of bigness, but that "the feeling [inferentially arrived at from the spread-out irritation on the part of the amœba] as a subject of inhesion is big." (P. 548.)

After this, we are disposed to agree with Mr. Peirce when he says: "This is, no doubt, a difficult idea to seize"; not, as he goes on to say, "for the reason that it is a subjective, not an objective, extension," but on the ground that the reasoning involves, plainly, not only the subjective and objective, but what Clifford calls the "ejective," as well, and this assumption, *inter alia*, that the last-named lies on the same plane as the former. Never, surely, was the conclusion that feelings have spatial extension more easily reached. It is only when we find that in (1) we are dealing with the objective pure and simple, observed phenomena; that in (2) the connection between irritation or excitation, and feeling is assumed, in the object, because feeling, subjectively, is found to accompany irritation; that (3) as the irritation, in the amœba, is spread out, so is the feeling to be viewed; and (4) that, as the feeling of the amœba, so is our feeling to be considered, viz.: that the feeling, "as a subject of inhesion, is big," we are led to say after all this, that, by such a process, anything, or everything, could be demonstrated, —the *field* of spatial extension, for example, having no more claim to be assumed than the *point* at which the irritation admittedly begins. Why should the *middle* stage of the irritation be selected in preference to the *initial* and *final* ones? The irritation originates in a

point, spreads, and then dies out. Thus our feeling, (we purposely use Mr. Peirce's nomenclature,) or idea, of an elephant, is unquestionably, as a subject of inhesion, "big." *But only for a time, and not at first.* Really, our idea, or feeling—in Synechism—of an elephant, must logically commence as a minute speck, and return to this vanishing-point again. There is no other way out of it. For must not the analogy of the irritated amœba be followed throughout, and if not, why not?

DUALISM AND THE WAY OUT.

The *crux* of philosophy, from the time of Hume to the present day, has been, what may be summarised as, the consciousness of succession *as* succession. The hours pass over the mental dial, but, though one succeeds the other, something is needed besides the succession of the terms of the series to give consciousness of the series *as a series*, to give the synthesis of the day made up of hours. Hume virtually gave up the problem in eviscerating the subjective. Prof. T. H. Green only missed the point at issue when he placed his eternal consciousness, which was to "have and to hold" the terms of the cosmical series, as it were in solution, for the human organism, *out of time altogether*. Mr. Peirce puts the matter boldly when he says: "An idea once past is gone forever, [in the sense of an event in an individual consciousness,] and any supposed recurrence of it is another idea." (P. 534.) In order, then, that an idea past may be present really, and not vicariously, the notion that consciousness necessarily occupies an interval of (finite) time must be given up; since, to put it briefly, a second past is as much past as a year. According to Mr. Peirce then, and his contention is supported by an elaborate inquiry into the nature of infinity and continuity generally, "we are immediately conscious through an infinitesimal interval of time." For the complete *rationale*, reference must necessarily be made to the article itself.

Even the above outline, however, is sufficient to show that, here as elsewhere, Mr. Peirce's dualism is his snare. Nothing but this could lead to a disintegration so complete as the following:

"In this infinitesimal interval, not only is consciousness continuous in a subjective sense, that is, considered as a subject, or substance, having the attribute of

duration; but also, because it is immediate consciousness, its object is *ipso facto* continuous." (P. 536.)

This is to admit, practically, that there is something in consciousness other than the consciousness itself. And this is evident, because at one and the same time, (whether an interval of finite time, or an infinitesimal interval,—whether an "instant" or a "moment,"—does not matter,) these two entities are different. For:

"This mediate perception is objectively, or as to the object represented, spread over the four instants; but subjectively, or as itself the subject of duration, it is completely embraced in the second moment." (*Ibid.*)

But this "mediate" and "immediate" cannot simultaneously exist, unless there is something else *to which* they do so exist. It is only paltering with us in a double sense to speak of "instant" and "moment" in this connection. The one may pass into the other, but there is "a time when" (it matters not whether the interval be finite or infinitesimal) they do not coexist. Hence, they are not the same, but different.

According to Mr. Peirce's notation, for all ordinary purposes we may write, if a is a finite quantity, and i an infinitesimal, $a+i=a$. "That is to say, this is so for all purposes of measurement." Be it so; the infinitesimal may be neglected for purposes of calculation. But such a formula can only be experimental. The theory which embodies it cannot avail for a world-scheme; to admit it would be to grant that a thing is, and is not, at one and the same time. Surely the most superficial reader will see that, to put it popularly, a world-scheme admits of no alternative subject to accept, or to reject, a neglectable quantity.

And this is not the only instance of dualism in Mr. Peirce's world-scheme as a totality. For have we not Synechism and Tychism as well? With the latter Mr. Peirce does not deal in the paper now under consideration. He must, however, be credited, or debited, with it, as held in reserve. For our present purpose it is not necessary to examine Tychism in detail. Its alleged existence is sufficient. For, and here let the significance of what follows be noted, in Mr. Peirce's view, as opposed to determinism, Tychism exists as a principle. It *is*, otherwise it could not be expounded as operative. But

it also exists as an idea, first, it may be, in our author's mind, and subsequently in the minds of his disciples. Thus it falls into the synechistic province: "As an idea it can only be affected by an idea, by anything but an idea it cannot be affected at all." ("The Law of Mind," p. 557.) Yet to affirm Tychism thus impotent, because unaffectible, outside the synechistic sphere, is to contradict Mr. Peirce's conclusions, for if Tychism is nothing outside the ideal realm, it is altogether inside it. Hence Synechism is everything practically, and Tychism nothing. But that Mr. Peirce will not have. He has a two-fold Tychism, that is the fact; actual and operative on the one hand, ideal on the other. And this is dualism confessed.

Mr. Peirce's method is quite fertile in duplication of the subjective entity. His latest paper, "Man's Glassy Essence," (*The Monist*, Vol. III, No. 1,) contains some typical instances.

"Viewing a thing from the outside, considering its relations of action and reaction with other things, it appears as matter. Viewing it from the inside, looking at its immediate character as feeling, it appears as consciousness." (P. 20.)

This is the strictly empirical view. And it may be possibly defended with the contention that all problems, to be duly examined, must, in the first place, be viewed from that standpoint. But it must be plainly manifest to any unprejudiced thinker that, even granted a total cosmical problem made up of separate problems of an individual nature, the same method of solving the sum cannot be employed which is used in solving its constituents. In the above instance, considering matter in its totality, and consciousness in its totality, what is left to view them indifferently from "outside," or "inside"? Plainly nothing. Still more transparent an example is the following:

"The consciousness of a habit involves a general idea. In each action of that habit certain atoms get thrown out of their orbit, and replaced by others. Upon all the different occasions it is different atoms that are thrown off, but they are analogous from a physical point of view, and there is an inward sense of their being analogous. Every time one of the associated feelings recurs, there is a more or less vague sense that there are others, that it has a general character, and of about what this general character is." (P. 20.)

This is part of the answer to the query: How do general ideas appear in the molecular theory of protoplasm? Now, without discussing the value of this *rationale*, as affecting Mr. Peirce's own theories, it is not difficult to see what its acceptance would "lead to." Certain atoms of a molecule get thrown out and are replaced by *others*. This happens repeatedly. On different occasions *different atoms* come and go. Yet they are "analogous," and there is "an inward sense" of this. Upon whose shoulders is the burden of proving the analogy placed, or of experiencing it even? With whom or what is there "an inward sense"? Perhaps it is better not to answer otherwise than to say that if this faculty be not present in the ever changing molecule to begin with, it cannot be logically reached by any process of multiplying it.

THE MONISTIC SOLUTION.

Monism, as a unitary system of the universe, does not necessarily commend itself to acceptance simply *as* monism. To say, this is dualism, *therefore* it cannot be a correct *rationale* of the universe, since the only true one must be monistic, is to start with an unphilosophical prepossession. The true solution may be twofold, or it may be manifold. But it is not too much to say, perhaps, on the other hand, that, even as causes may not be multiplied without necessity, even so phenomena must not logically be divided into independent groupings without sufficient reason given. Preference should be accorded to a monistic, rather than to a dualistic, system, not on the ground alone of the simplicity of the former, but on the ground that a theory which has one explanation for one set of phenomena and another explanation for a second set, must first demonstrate that a unitary conception of the universe is, at least, improbable, otherwise it will always be hinted that the dualism in question has not gone deep enough to find a synthetic bond wherewith to unite the apparently diverse. Mr. Peirce, throughout his article on Synechism, constantly touches, despite his latent dualism, the margin of a truth so great as to merit the title of transcendent. As often he misses it. And his concluding words are, in this connection, almost wistful: "The facts that stand before our face and

eyes and stare us in the face, are far from being, in all cases, the ones most easily discerned. That has been remarked from time immemorial." (P. 559.) But though thus "remarked," the maxim has, as immemorially, been neglected in practice. To none can this remark be more fitly applied than to the excogitator of Synechism, himself seeing that, having arrived at the point of asserting that "there must be *something like* the feelings in the excitants themselves," he does not see that the excitant and the feeling are one and the same; and that there is no second or third term in the cosmical equation.

Does this seem "extravagant"? If so, the reply must be *not* that it is the only escape from an otherwise inexplicable difficulty, but that there is really no difficulty at all. What Mr. Peirce's own Synechism "*leads to*" is that the past, the present, and the to-come, alike of matter and idea, are not reconciled by "time and its flow," or even by the logic of infinitesimals, subtle though that may be, but that the contents of each and all, with all their apparently infinite variety, resolve into a consistent unity.

THE "MISSING LINK."

Pushed to a logical conclusion, the excitants and the feelings owe their apparent variety to their assigned position in a series, the correspondence or relation between them being *only another link in the self-same chain.* Vulgar realism never fathoms this explanation. It always harps upon the one string that idealism, and more especially idealistic monism, fails to account for variety or difference; forgetting, or rather never seeing, that difference or variety which is its essence, is only one more added perception on the same plane with ordinary perceptions; so that given *a*, *b*, *c*, *d*,—sundry perceptions,—their essential variety may be stated as *e*. Or this may be stated numerically; variety, as a whole, being nothing more than the sum of differences, which is always something other than the terms differentiated, but always on the same level with them—the difference between any continuous number, above unity, and another number being a third number, which is different from either. Variety in numbers cannot be expressed otherwise than numerically.

So, in the last recess, the variety of colors is only colorable, of tones audible, and so on. The "vibrations of inconceivable complexity" which, according to Mr. Peirce, "excite sight and hearing," can be approximately stated numerically, so that the difference between red and, say, yellow, is a number corresponding to another color, which may be orange or not; it being part of the present scientific theory of light that any specific number of ethereal undulations happening between the colors of the ocular spectrum, corresponds to a possible color, although the retinal expanse may be insensible to these particular rates of tremor. To Mr. Peirce it may appear "extravagant," but the difference between any two colors and tones is another color, another tone; just as the difference between any two numbers is a third number. This is the logical outcome of his own Synechism; *this*, in part, is what it "leads to."

TIME AND ITS "FLOW" RATIONALISED.

Excitants and feelings being unified, and the element of variety, hitherto supposed to be the exclusive copyright of vulgar realism, shown to be nothing but another term added to the series, or, numerically, a concurrent series—so that should a, b, c, d . . . be a series, the variety of the series may be expressed as e, or the individual differences as f, g, h. . .—it only needs an examination of what Mr. Peirce terms "time and its flow," to render his system a completely monistic one, and this although true monism is much more than the negation of determinism, synechistically expressed.

In Mr. Peirce's article under examination, "The Law of Mind," the notation of infinitesimals, which forms the keystone of Synechism, is only introduced after a lament over the incapacity, or unworkableness rather, of finite time, when the duration of consciousness is involved. If *finite* time is to come in as a factor—"an idea once past [in the sense of an event in an individual consciousness] is gone forever, and any supposed recurrence of it is another idea" (p. 534). And the problem which Mr. Peirce sets himself to solve is how in effect to bring *back* this past idea—not vicariously—but in all its pristine freshness, into the now-time. This is sought to be accomplished by the explanation that the past idea is "not wholly

past, it is only going, less past than any assignable past date"—and so on through the intricacies of Mr. Peirce's infinitesimal theory, into which we need not enter at present. But the statement of the, supposed, difficulty which finite time presents in this connection,—the past idea really past and gone, and the recurrence of it another idea,—if put in a slightly different form, hints a solution, in continuity with the foregoing pages, without the aid of the infinitesimal at all. *That an idea is once past and gone*, any occurrence, or recurrence, of this idea, *is another idea.**

But, in the meantime, let us see what Mr. Peirce has to say regarding "time and its flow":

"One of the most marked features about the law of mind is, that it makes time to have a definite direction of flow from past to future. The relation of past to future is, in reference to the law of mind, different from the relation of future to past. This makes one of the great contrasts between the law of mind and the law of physical force, where there is no more distinction between the two opposite directions in time than between moving northward, and moving southward" (p. 546).

This for once is not very clear. It is difficult to see how "the law of physical force" can be spoken of as "in time," to the exclusion of mind; not easy, also, to understand the distinction further insisted upon. But the intention is evident, viz., to perpetuate, if not to originate, a cosmical duality. Time, it would seem, marches indifferently in at least two directions, though it is not very clear how this is accomplished. And then the old fiction follows, that "Time, as the universal form of change, cannot exist unless there is something to undergo change, etc." (p. 547.)

The same notation suits in this case as in the foregoing. Time is only another term in the series. If a, b, c, d be a series, e is the variety, f the whole time involved, and g the individual intervals. Of course all this is not a simple series, it is an infinitely complicated one; the above arrangement is only intended to show that difference, variety, time, etc., are no mysterious entities pervading events, acting as their "form" or carrying them in their "flow," but simply percepts, or concepts, on a level with others.

* Or to put it in another form, any one idea, and the timing of this idea are really two ideas, although, as we shall see later, they may be inseparable in practice.

This is not patent on the surface, it may be. Time has the appearance of a current in which events float. But this is an illusion dispelled by examination. Events cannot be submerged in time. Time cannot be the vehicle of events. It is impossible to conceive time as existing simultaneously with an event. It always follows it. What to Mr. Peirce appears as a "flow," arises from the foregoing. Take events, percepts, or concepts, as a hypothetical series, *a*, *b*, *c*, *d* . . . . . and their times as *a'*, *b'*, *c'*, *d'*. . . . the first series contains the event *per se*, or as happening; the "time when" is contained in the second series, practically inseparable from the first, but the time when necessarily follows—consequently if the first be *a*, the second must be, at least *a'*. But no concept or percept is abstract, except the concept time itself, which, being unconnected, *seems* anywhere, and, like its fellow-abstract space, is spread out, to us, tri-dimensionally, as past, present, and to come. And, as in space the position is simply spectral,* a question of perspective or adjustment, so, in time, the timal series is adjusted to the substantive idea. But this twofold spectral succession breeds by comparative intensity (which is another complex series) the sense of a flow, where there is none, but only the idea of a flowing, which is another matter. Thus, the so-called "veil of the future" is no more a veil than it is a brick-bat. It is simply the indeterminateness of an unconnected adjective —as if one should say, white—and the query arises, *What* is it that is white? When the noun is supplied you have something definite. Just so, when the future lapses into the present.

Thus there is never anything without, at least, these three additions: first, variety or difference; second, time; third, relation, spatial or otherwise. These are all terms in a series, or set of concurrent series. Nothing can be, practically, isolated, for everything runs in a series. But this is a much broader theory of continuity than that which Synechism affords.† All apparent perplexities vanish. The difficulty no longer exists that to perceive a series we must hold it, as it were, in solution. Since other than series nothing is.

* Cf., in this connection, the results of experiments by Cheselden, as far back as 1727 on congenitally blind persons, couched for double cataract.

† Much more inclusive, also, than the Relational Theory of the Neo-Kantians.

Hence the cosmos is an illimitable series or complex of series. But inasmuch as the timal element (as also the spatial) occurs through the series having time-term and space-term resident within it, all difficulty in apprehending it as a series vanishes. The impracticability, if any, would be in viewing any term as isolated.

THE RESULT *RE* TYCHISM.

What a flood of light does such a system shed indirectly upon Tychism, since the controversy between the latter and determinism mainly hinges upon the "must be," the imperative, as it were, of the series! It has been very ably pointed out by Dr. Carus in his article *re* Mr. Peirce's "Onslaught on the Doctrine of Necessity" (*The Monist*, Vol. II, No. 4, pp. 573–4) that the formula adopted by Mr. Peirce in his Tychism, "chance is first, law is second, the tendency of habits is third," involves its author in the admission of a law in a system professing to be, in its inception at all events, chanceful and *lawless*. Mr. Peirce's "Synechism" professes to be the law of mind. Parenthetically, however, it may be remarked, that the distinction as to law, and lawlessness or "chance," narrows itself to the plane of one term more or less in a series, or *even to less than that subordinate place*. For, although, for convenience sake, and for facility of contrast, we have followed Mr. Peirce's figure of a series, to show more clearly also to what his theory leads, it is nevertheless plain, that time and its accompanying relations being placed on their proper level, that of integral percepts and concepts, the figure of a series is simply a matter of convenience of arrangement. Certainly as the "time when" is necessarily annexed to every percept and concept the timal element may be said to follow, not to precede, its fellow-term. Really, however, they may be said to be simultaneous, since the timal refinements of finite, infinite, past, present, and future are each of them contained in a percept of its own.

EXTERNALITY A SERIAL TERM.

But if the timal element be independent as a separate percept, the spatial as another, and so on, it follows that, although the terms of the series may, as it were, *run*, though we cannot conceive them

separated, or as, in practice, otherwise than as continuous in their flow, still, theoretically, a series or complex of series it *is*, and a series may be interrupted at any term. Thus externality itself being a spatial relation, is but *one term more*, non-essential in theory, to the term preceding. So that when the Neo-Kantians speak of the "constitution of the objective" it ought to be added that it is not only the content of the objective which is thus constituted by consciousness, but that externality, all that goes to make up what is termed "out-sidedness," is constituted by consciousness also.

THE NOW-TIME.

"*The present is half past, and half to come,*" (p. 546) like the color of a curved boundary line on a particolored surface; i. e. "betwixt and between" the two. It is here that the theory of Synechism shows its chief defect. Up to this stage we have been dealing with ideas, feelings, *a*, *b*, *c*, *d* . . . successively passing through a point of consciousness *e*. And the infinitesimal notation suits the required process fairly well. It is complicated enough, but it is ingenious, and at least plausible. Nothing up to this stage would lead us to suppose that any additional element was to be imported into the *rationale* which Mr. Peirce presents. As we have seen, finite time would not serve his purpose. By however minute a *finite* interval have *a*, *b*, *c* or *d* passed the point *e*, all chance of their recovery is hopeless. Well, we have recourse to infinitesimals, and find (to put it popularly, and not in Mr. Peirce's technical terms) that *a* past the point of consciousness by an infinitesimal interval heralds *b*. So that *e* is simultaneously confronted with the disappearing form of the first and the appearing form of the second, and the same with *b*, and *c*, in turn, and so on. Thus the present, in the sense of ideas successively passing through consciousness, is half *a* and half *b*, then half *b* and half *c*, this infinitesimal gradation ultimately ensuring the presence of the whole series in the last "moment."

But this will not avail with the concept time itself as distinguished from timed succession. That these two are separate with Mr. Peirce it is impossible to doubt. He says, e. g., "Time with its continuity logically involves some other kind of continuity than

its own," (p. 547) and speaks of "time and its flow," and of "time as the universal form "of change." And it is confusing, to say the least, when we are shifted without warning from what is practically the perceptual to the conceptual region. Granted the ideas, the feelings, or what not, "gliding almost imperceptibly" (as did the late Mr. Bardell to another sphere) past the central point of consciousness, yet not wholly past, only going, less past than any assignable past date, granted this, the assertion is not consequently warranted that time itself, the *present*, as time, not as involving the succession of ideas, is "half past and half to come." The ideas, the feelings, of which Mr. Peirce writes, successively pass through the stage of being thus half past and half to come, but that is by no means the same thing as saying that the present is half past, half to come, as Synechism avers. With our theory, as presented in the foregoing pages there is indeed no such difficulty, but Mr. Peirce, on the other hand, has elected to stand by infinitesimally measuring time, as applied to ideas etc., as separate from conceptual time, and must take the consequences of his decision. He says *the present, not the present idea.*

Now, in the concept time as a whole, in its entire range, a definite point may be selected—to the exclusion of other points—a point having position but not extension, as *the present.* Is it, then,—the present,—half past, half to come, as a timed idea is? Certainly not. There is nothing of the flow of a series in it. Further, this selection of the "now," as a point, does not interfere with its permanence. "Nowness" may persist. And the moment it partook, even infinitesimally, of the character of the past or of the future, it would cease to be the present. In the case of a series of ideas in time the difficulty is to get them all in present solution, as it were, without detriment to their evident continuity, but the definition of the present as a point in time presents no such difficulty. The conditions are quite distinct. Yet regarding this time point—the present—Mr. Peirce assures us that it is "half past, half to come," which is just that of which it is the precise negation, if words are to have any meaning.

Again, Mr. Peirce's *rationale* shows, upon the face of it, that there is (1) finitely divisible time and (2) time divided infinitesi-

mally, for what finite time could not do, in that it had limitations, the infinitesimal notation readily accomplishes. In its ulterior consequences, this is somewhat unfortunate for Synechism, inasmuch as the consciousness of ideas in continuity being confined to the infinitesimal theory, where, it may be asked, is the place, in consciousness, for the succession of finite intervals? Consciousness must be practically doubled, so to speak, if it is to hold both of these together. This is what comes of making one's world-scheme hang upon a mathematical subtlety—the subtlety in question partaking as a rule, more or less of the nature of an escape from the difficulties of the vulgar notation, the vulgar notation remains to be reckoned with, and both have to be credited to consciousness. As an instance of this take the following from Mr. Peirce's late article,* "Man's Glassy Essence"—p. 15:

"In order that a sub-molecule of food may be thoroughly and firmly assimilated into a broken molecule of protoplasm, it is necessary not only that it should have precisely the right chemical composition, but also that it should be at precisely the right spot *at the right time* and should be moving in precisely the right direction with precisely the right velocity. If all these conditions are not fulfilled, ... it will be in special danger of being thrown out again" (The italics are not in the original)."

Now here is a "time when" which can be exactly specified in accordance with the conditions. Certain results follow unless it is kept to. This is what Mr. Peirce would doubtless consider as a timed physical event, part and parcel of the regularity of matter, and yet an event which, in its own time and way, goes to account for both feeling and habit-taking—capable, therefore, of being stated in terms of finite time, as happening at a given instant, and neither before nor after it. But when this same molecule is, by virtue of keeping its appointment punctually, safely installed in feeling protoplasm, the succession of ideas, or feelings, of which, as subject, it is capable, obeys another rule—a given *instant* obtains no longer; it is the *moment* which is everything†—a moment half its predecessor,

* *The Monist*, Vol. III, No. 1.

† Mr. Peirce uses the word "instant" to mean a point of time, and "moment" to mean an infinitesimal duration.

half its successor. Even granted the function of the infinitesimal, this looks very much like a reduction to absurdity. For, if the above mentioned timed coalescence of the sub-molecule with the broken molecule were *also* a matter of subjective feeling, passed as process through a consciousness, the conclusion follows that the juncture of the molecules happens at two different times! There is no escape from this. Given the *instant* in the one case, the *moment* in the other, these two cannot possibly be the same point in time. The moment partakes, however insensibly, of the preceding and succeeding stages, the instant does not. Hence they are not the same but different times.

OTHERNESS.

The foregoing has a distinct bearing upon the question of "other selves" of which Mr. Peirce writes as follows:

> "The recognition by one person of another's personality takes place by means to some extent identical with the means by which he is conscious of his own personality. The idea of the second personality, which is as much as to say that second personality itself, enters within the field of direct consciousness of the first person, and is as immediately perceived as his ego, though less strongly. At the same time, the opposition between the two persons is perceived, so that the externality of the second is recognised." ("The Law of Mind," p. 558.)

This is the scheme of "otherness" which, in the case of the Neo-Kantians, particularly the French section, represented by M. Pillon, M. Renouvier, and others, has proved such a snare. To these thinkers, (as indeed to the late Prof. T. H. Green, of Oxford, though in a less degree,) the so-called external world lies in "other" thinking subjects—in "foreign centres of representations." The free-trade doctrine has verily penetrated to the philosophic region—the wholesale admission of foreign wares to the detriment of home products. Why should I place the content of that so-called external world, which, external or internal, is my very own inalienably, in a centre of representation other than my own, thus making my cognition of it rest entirely upon the "ejective" plane? It is only when I discover, as I must sooner or later, that there is nothing in the report of an "outsider" (or in any number of them) beyond what I credit him or her with in my own consciousness; and

that the outsider is on the same plane as other objects, it is only then that the mystification is cleared up. I do *not* cognise, or recognise, the external at second-hand. The "note" of otherness is simply another term more or less in the cosmical series.

It is, however, not only with the familiar "other selves" of ordinary life that we are confronted in Synechism. In the creed of animism

> "Millions of spiritual creatures walk the earth,"

and Mr. Peirce speaks of "spiritual influences" (p. 559) as having at least no hindrance presented to them by his doctrine. But he has some other shadowy personalities at command, which, it must be confessed, are well calculated to give us pause. "There should be something like* personal consciousness in bodies of men who are in intimate and intensely sympathetic communion. . . . None of us can fully realise which the minds of corporations are. . . . But the law of mind clearly points to the existence of such personalities." It is probably true that the "minds of corporations," must ever present an insoluble riddle of perversity to the suburban dweller, vexed with the mockery of paving and lighting. But we need not linger over this speculation, for there are other shades behind.

> "If such a fact is capable of being made out anywhere it should be in the Church. . . . Surely a personality ought to have developed in that Church, in that 'bride of Christ,' as they call it." ("Man's Glassy Essence," pp. 21–22.)

A PERSONAL CREATOR.

Bearing our ecclesiastical divisions in mind, it is difficult to conceive the unity of a "corporate personality" of this kind, but, to let that pass, it may be remarked that, when any one begins to imagine that there are others in the universe besides himself, he is not, as a rule, content with two or three companions of his solitude. They come in battalions. Thus, behind the other selves, corporate personalities and spiritual influences of Synechism, there looms a transcendent personality. "A genuine evolutionary philosophy," we are told, ". . . . is so far from being antagonistic to the idea of

* The phrase, "something like," is significant, when we remember, (see *ante*,) that with Mr. Peirce the excitants were "something like" the excited feelings.

a personal creator, that it is really inseparable from that idea." And a philosophy of pseudo-evolutionism is "hostile to all hopes of personal relations to God." ("The Law of Mind," p. 557.)

Mr. Peirce thus assigns to his first cause a place in the *continuum* of ideas, and says that if there is a personal God we must have a direct perception of that person and "indeed be in personal communication with him." The difficulty, he admits, is that if this be so, how is it possible that the existence of this being should ever have been doubted by anybody. And the only answer he can at present make is, that "facts that stand before our face and eyes, and stare us in the face, are far from being in all cases the ones most easily discerned. That," he adds, "has been remarked from time immemorial." ("The Law of Mind," pp. 558–559.)

One of the ablest of living philosophical writers, Professor Veitch, of Glasgow University, puts it somewhat similarly, though with his own realistic coloring, when he says:

"God, if at all, must rise above the line of finite regress; He cannot be a cause in that; He cannot be a cause dependent on another cause; He must be somewhere, or at some point, in the line of an otherwise endless scientific regress, there, above it, yet related to it, and in it; otherwise He is nothing for us." ("Knowing and Being," p. 320.)

The parallelism is worth noting. Those views embody what has been the contention of the present writer throughout this paper, *with this most notable difference*: that no term of a series may thus transcend the series, or be other than on a level with the other terms, being itself only a term, a link, in the series itself. And with this falls forever the idea of a cause uncaused.

Yet am *I* not *in* the series? For all that is in the series is mine every percept, every concept; so that, "extravagant" as it may appear, it is *I who am the series*. In other words, the ego is the universe-synthesis, and the universe-synthesis the ego.

Is Mr. Peirce prepared to take the consequences of that which his Synechism leads to?

G. M. McCrie.

THE FOURTH DIMENSION.

MATHEMATICAL AND SPIRITUALISTIC.

INTRODUCTORY.

THE tendency to generalise long ago led mathematicians to extend the notion of three-dimensional space, which is the space of sensible representation, and to define aggregates of points, or spaces, of more than three dimensions, with the view of employing these definitions as useful means of investigation. They had no idea of requiring people to imagine four-dimensional things and worlds, and they were even still less remote from requiring of them to believe in the real existence of a four-dimensioned space. In the hands of mathematicians this extension of the notion of space was a mere means devised for the discovery and expression, by shorter and more convenient ways, of truths applicable to common geometry and to algebra operating with more than three unknown quantities. At this stage, however, the spiritualists came in, and coolly took possession of this private property of the mathematicians. They were in great perplexity as to where they should put the spirits of the dead. To give them a place in the world accessible to our senses was not exactly practicable. They were compelled, therefore, to look around after some *terra incognita*, which should oppose to the spirit of research inborn in humanity an insuperable barrier. The residence of the spirits had to be a place inaccessible to our senses and full of mystery to the mind. This property the four-dimensioned space of the mathematicians possessed. With an intellectual perversity which science has no idea of, these spiritualists boldly asserted, first, that the whole world was so sit-

uated in a four-dimensioned space as a plane might be situated in the space familiar to us, secondly, that the spirits of the dead lived in such a four-dimensioned space, thirdly, that these spirits could accordingly act upon the world and, consequently, upon the human beings resident in it, exactly as we three-dimensioned creatures can produce effects upon things that are two-dimensional; for example, such effects as that produced when we shatter a lamina of ice, and so influence some possibly existing two-dimensioned *ice*-world.

Since spiritualism, under the leadership of the Leipsic Professor Zöllner, thus proclaimed the existence of a four-dimensioned space, this notion, which the mathematicians are thoroughly master of,—for in all their operations with it, though they have forsaken the path of actual representability, they have never left that of the truth,—this notion has also passed into the heads of lay persons who have used it as a catchword, ordinarily without having any clear idea of what they or any one else mean by it. To clear up such ideas and to correct the wrong impressions of cultured people who have not a technical mathematical training, is the purpose of the following pages. A similar elucidation was aimed at in the tracts which Schlegel (Riemann, Berlin, 1888) and Cranz (Virchow-Holtzendorff's Sammlung, Nos. 112 and 113) have published on the so-called fourth dimension. Both treatises possess indubitable merits, but their methods of presentation are in many respects too concise to give a lay mind any profound comprehension of the subject. The author, accordingly, has been able to add to the reflections which these excellent treatises offer, a great deal that appears to him necessary for a thorough explanation in the minds of non-mathematicians of the notion of the fourth dimension.

I.

THE CONCEPT OF DIMENSION.

Many text-books of stereometry begin with the words: "Every body has three dimensions, length, breadth, and thickness." If we should ask the author of a book of this description to tell us the length, breadth, and thickness of an apple, of a sponge, or of a cloud of tobacco smoke, he would be somewhat perplexed and would prob-

ably say, that the definition in question referred to something different. A cubical box, or some similar structure, whose angles are all right angles and whose bounding surfaces are consequently all rectangles is the only body of which it can at all be unmistakably asserted that there are three principal directions distinguishable in it, of which any one can be called the length, any other the breadth, and any third the thickness. We thus see that the notions of length, breadth, and thickness are not sufficiently clear and universal to enable us to derive from them any idea of what is meant when it is said that every body possesses three dimensions, or that the space of the world is three-dimensional.

This distinction may be made sharper and more evident by the following considerations: We have, let us suppose, a straight line on which a point is situated, and the problem is proposed to determine the position of the point on the line in an unequivocal manner. The simplest way to solve this is, to state how far the point is removed in the one or the other direction from some given fixed point; just as in a thermometer the position of the surface of the mercury is given by a statement of its distance in the direction of cold or heat from a predetermined fixed point—the point of freezing water. To state, therefore, the position of a point on a straight line, the sole datum necessary is a single number, for beforehand we have fixed upon some standard line, like the centimetre, and some definite point to which we give the value zero, and have also previously decided in what direction from the zero-point, points must be situated whose position is expressed by positive numbers, and also in what direction those must lie whose position is expressed by negative numbers. This last mentioned fact, that a *single* number is sufficient to determine the place of a point in a straight line, is the real reason why we attribute to the straight line or to any part of it a single dimension.

More generally, we call every totality or system, of infinitely numerous things, *one*-dimensional, in which *one* number is all that is requisite to determine and distinguish any particular one of these things amidst the entire totality. Thus, time is one-dimensional. We, as inhabitants of the earth, have naturally chosen as our unit

of time, the period of the rotation of the earth about its axis, namely, the day, or a definite portion of a day. The zero-point of time is regarded in Christian countries as the year of the birth of Christ, and the positive direction of time is the time *subsequent* to the birth of Christ. These data fixed, all that is necessary to establish and distinguish any definite point of time amid the infinite totality of all the points of time, *is a single number*. Of course this number need not be a whole number, but may be made up of the sum of a whole number and a fraction in whose numerator and denominator we may have numbers as great as we please. We may, therefore, also say that the totality of all conceivable numerical magnitudes, or of only such as are greater than one definite number and smaller than some other definite number, is one-dimensional.

We shall add here a few additional examples of one-dimensioned magnitudes presented by geometry. First, the circumference of a circle is a one-dimensional magnitude, as is every curved line, whether it returns into itself or not. Further, the totality of all equilateral triangles which stand on the same base is one-dimensional, or the totality of all circles that can be described through two fixed points. Also, the totality of all conceivable cubes will be seen to be one-dimensional, provided they are distinguished, not with respect to position, but with respect to magnitude.

In conformity with the fundamental ideas by which we define the notion of a one-dimensional manifoldness, it will be seen that the attribute *two*-dimensional must be applied to all totalities of things in which *two* numbers are necessary (and sufficient) to distinguish any determinate individual thing amid the totality. The simplest two-dimensioned complex which we know of is the plane. To determine accurately the position of a point in a plane, the simplest way is to take two axes at right angles to each other, that is, fixed straight lines, and then to specify the distances by which the point in question is removed from each of these axes.

This method of determining the position of a point in a plane suggested to the celebrated philosopher and mathematician Descartes the fundamental idea of analytical geometry, a branch of mathematics in which by the simple artifice of ascribing to every point in

a plane two numerical values, determined by its distances from the two axes above referred to, planimetrical considerations are transformed into algebraical. So, too, all kinds of curves that graphically represent the dependence of things on time, make use of the fact that the totality of the points in a plane is two-dimensional. For example, to represent in a graphical form the increase of the population of a city, we take a horizontal axis to represent the time, and a perpendicular one to represent the numbers which are the measures of the population. Any two lines, then, whose lengths practical considerations determine, are taken as the unit of time, which we may say is a year, and as the unit of population, which we will say is one thousand. Some definite year, say 1850, is fixed upon as the zero point. Then, from all the equally distant points on the horizontal axis, which points stand for the years, we proceed in directions parallel to the other axis, that is, in the perpendicular direction, just so much upwards as the numbers which stand for the population of that year require. The terminal points so reached, or the curve which runs through these terminal points, will then present a graphic picture of the rates of increase of the population of the town in the different years. The rectangular axes of Descartes are employed in a similar way for the construction of barometer curves, which specify for the different localities of a country the amount of variation of the atmospheric pressure during any period of time. Immediately next to the plane the surface of the earth will be recognised as a two-dimensional aggregate of points. In this case geographical latitude and longitude supply the two numbers that are requisite accurately to determine the position of a point. Also, the totality of all the possible straight lines that can be drawn through any point in space is two-dimensional, as we shall best understand if we picture to ourselves a plane which is cut in a point by each of these straight lines and then remember that by such a construction every point on the plane will belong to some one line and, *vice versa*, a line to every point, whence it follows that the totality of all the straight lines which pass through the point assigned are of the same dimensions as the totality of the points of the imagined plane.

The question might be asked, In what way and to what extent

in this case is the specification of *two* numbers requisite and sufficient to determine amid all the rays which pass through the specified point a definite individual ray? To get a clear idea of the problem here involved, let us imagine the ray produced far into the heavens, where some quite definite point will correspond to it. Now, the position of a point in the heavens depends, as does the position of a point on all spherical surfaces, on two numbers. In the heavens these two numbers are ordinarily supplied by the two angles called altitude, or the distance above the plane of the horizon, and azimuth, or the angular distance between the circle on which the altitude is measured and the meridian of the observer. It will be seen thus that the totality of all the luminous rays that an eye, conceived as a point, can receive from the outer world is two-dimensional, and also that a luminous point emits a two-dimensional group of luminous rays. It will also be observed, in connection with this example, that the two-dimensional totality of all the rays that can be drawn through a point in space is something different from the totality of the rays that pass through a point but are required to lie in a given plane. Such a group of objects as the last-named one, is a one-dimensional totality.

Now that we have sufficiently discussed the attributes that are characteristic of one and two-dimensional aggregates, we may, without any further investigation of the subject, propose the following definition, that, generally, *an n-dimensional totality of infinitely numerous things is such, with respect to which the specification of n numbers is necessary and sufficient to indicate a definite individual amid the totality of all the infinitely numerous individuals of the group.*

Accordingly, the point-aggregate made up of the world-space which we inhabit, is a three-dimensional totality. To get true bearings in this space and to define any determinate point in it, we have therefore to lay through any point which we take as our zero-point three axes at right angles to each other, one running from right to left, one backwards and forwards, and one upwards and downwards. We then join each two of these axes by a plane and are enabled thus to specify the position of every point in space by the three perpendicular distances by which the point in question is removed in a

positive or negative sense from these three planes. It is customary to denote the numbers which are the measures of these three distances by x, y, and z, the positive x, positive y, and positive z ordinarily being reckoned in the right hand, the forward, and the upward directions from the origin. If now, with direct reference to this fundamental axial system, any particular specification of x, y, and z be made, there will, by such an operation, be cut out and isolated from the three-dimensional manifoldness of all the points of space a totality of less dimensions. If, for example, z is equal to seven units or measures, this is equivalent to a statement that only the two-dimensional totality of the points is meant, which constitute the plane that can be laid at right angles to the upward-passing z-axis at a distance of seven measures from the zero-point. Consequently, every imaginable equation between x, y, and z isolates and defines a two-dimensional aggregate of points. If two different equations obtain between x, y, and z, two such two-dimensional totalities will be isolated from among all the points of space. But as these last must have some one-dimensional totality in common, we may say that the co-existence of two equations between x, y, and z defines a one-dimensional totality of points, that is to say a straight line, a line curved in a plane, or even, perhaps, one curved in space. It is evident from this that the introduction of the three axes of reference forms a bridge between the theory of space and the theory of equations involving three variable quantities, x, y, z. The reason that the theory of space cannot thus be brought into connection with algebra in general, that is, with the theory of indefinitely numerous equations, but only with the algebra of three quantities, x, y, z, is simply to be sought in the fact that space, as we picture it, can only have three dimensions.

We have now only to supply a few additional examples of n-dimensional totalities. All particles of air are four-dimensional in magnitude when in addition to their position in space we also consider the variable densities which they assume, as they are expressed by the different heights of the barometer in the different parts of the atmosphere. Similarly, all conceivable spheres in space are four-dimensional magnitudes, for their centres form a three-dimensional

point-aggregate, and around each centre there may be additionally conceived a one-dimensional totality of spheres, the radii of which can be expressed by every numerical magnitude from zero to infinity. Further, if we imagine a measuring stick of invariable length to assume every conceivable position in space, the positions so obtained will constitute a five-dimensional aggregate. For, in the first place, one of the extremities of the measuring stick may be conceived to assume a position at every point of space, and this determines for one extremity alone of the stick a three-dimensional totality of positions; and secondly, as we have seen above, there proceeds from every such position of this extremity a two-dimensional totality of directions, and by conceiving the measuring-stick to be placed lengthwise in every one of these directions we shall obtain all the conceivable positions which the second extremity can assume, and consequently, the dimensions must be 3 plus 2 or 5. Finally, to find out how many dimensions the totality of all the possible positions of a square, invariable in magnitude, possesses, we first give one of its corners all conceivable positions in space, and we thus obtain three dimensions. One definite point in space now being fixed for the position of one corner of the square, we imagine drawn through this point all possible lines, and on each we lay off the length of the side of the square and thus obtain two additional dimensions. Through the point obtained for the position of the second corner of the square we must now conceive all the possible directions drawn that are perpendicular to the line thus fixed, and we must lay off once more on each of these directions the side of the square. By this last determination the dimensions are only increased by one, for only one one-dimensional totality of perpendicular directions is possible to one straight line in one of its points. Three corners of the square are now fixed and therewith the position of the fourth also is uniquely determined. Accordingly, the totality of all equal squares which only differ from one another by their position in space, constitutes a manifoldness of six dimensions.

II.

THE INTRODUCTION OF THE NOTION OF FOUR-DIMENSIONAL POINT-AGGREGATES, PERMISSIBLE.

In the preceding section it was shown that we can conceive not only of manifoldnesses of one, two, and three dimensions, but also of manifoldnesses of *any* number of dimensions. But it was at the same time indicated that our world-space, that is, the totality of all conceivable *points* that differ only in respect of position, cannot in agreement with our notions of things possess more than three dimensions. But the question now arises, whether, if the progress of science tends in such a direction, it is permissible to extend the notion of space by the introduction of point-aggregates of more than three dimensions, and to engage in the study of the properties of such creations, although we know that notwithstanding the fact that we may conceptually establish and explore such aggregates of points, yet we cannot picture to ourselves these creations as we do the spatial magnitudes which surround us, that is, the regular three-dimensional aggregates of points.

To show the reader clearly that this question must be answered in the affirmative, that the extension of our notion of space is permissible, although it leads to things which we cannot perceive by our senses, I may call the reader's attention to the fact that in arithmetic we are accustomed from our youth upwards to extensions of ideas, which, accurately viewed, as little admit of graphic conception as a four-dimensional space, that is, a point-aggregate of four dimensions. By his senses man first reaches only the idea of whole numbers—the results of counting. The observation of primitive peoples* and of children clearly proves that the essential decisive factors of counting are these three: First, we abstract, in the counting of things, completely from the individual and characteristic attributes of these things, that is, we consider them as homogeneous. Second, we associate individually with the things which we count

* This is discussed at greater length in my tract *Zahl und Zählen* in Virchow-Holtzendorff's collection of popular essays, J. F. Richter, 1887.

other homogeneous things. These other things are even now, among uncivilised peoples, the ten fingers of the two hands. They may, however, be simple strokes, or, as in the case of dice and dominoes, black points on a white background. Third, we substitute for the result of this association some concise symbol or word ; for example, the Romans substituted for three things counted, three strokes placed side by side, namely: III ; but for greater numbers of things they employed abbreviated signs. The Aztecs, the original inhabitants of Mexico, had time enough, it seems, to express all the numbers up to nineteen by equal circles placed side by side. They had abbreviated signs only for the numbers 20, 400, 8000, and so forth. In speaking, some one same sound might be associated with the things counted ; but this method of counting is nowadays employed only by clocks : the languages of men since prehistoric times have fashioned concise words for the results of the association in question. From the notion of number, thus fixed as the result of counting, man reached the notion of the addition of two numbers, and thence the notion that is the inverse of the last process, the notion of subtraction. But at this point it clearly appears that not every problem which may be propounded is soluble ; for there is no number which can express the result of the subtraction of a number from one which is equally large or from one which is smaller than itself. The primary school pupil who says that 8 from 5 "won't go" is perfectly right from his point of view. For there really does not exist any result of counting which added to eight will give five.

If humanity had abided by this point of view and had rested content with the opinion that the problem "5 minus 8" is not solvable, the science of arithmetic would never have received its full development, and humanity would not have advanced as far in civilisation as it has. Fortunately, men said to themselves at this crisis: "If 5 minus 8 won't go, we'll *make it go;* if 5 minus 8 does not possess an intelligible meaning, we will simply give it one." As a fact, things which have not a meaning always afford men a pleasing opportunity of investing them with one. The question is, then, what significance is the problem "5 minus 8" to be invested with?

The most natural and, therefore, the most advantageous solution undoubtedly is to abide by the original notion of subtraction as the inverse of addition, and to make the significance of 5 minus 8 such, that for 5 minus 8 plus 8 we shall get our original minuend 5. By such a method all the rules of computation which apply to real differences will also hold good for unreal differences, such as 5 minus 8. But it then clearly appears that all forms expressive of differences in which the number that stands before the minus direction is less by an equal amount than that which follows it may be regarded as equal; so that the simplest course seems to be to introduce as the common characteristic of all equal differential forms of this description a common sign, which will indicate at the same time the difference of the two numbers thus associated. Thus it came about, that for 5 minus 8, as well as for every differential form which can be regarded as equal thereto the sign "-3" was introduced. But in calling differential forms of this description numbers, the notion of number was extended and a new domain was opened up, namely, the domain of negative numbers.

In the further development of the science of arithmetic, through the operation of division viewed as the inverse of multiplication, a second extension of the idea of number was reached, namely, the notion of fractional numbers as the outcome of divisions that had led to numbers hitherto undefined. We find, thus, that the science of arithmetic throughout its whole development has strictly adhered to the principle of conformity and consistency and has invested every association of two numbers, which before had no significance, by the introduction of new numbers, with a real significance, such that similar operations in conformity with exactly the same rules could be performed with the new numbers, viewed as the results of this association, as with the numbers which were before known and perfectly defined. Thus the science proceeded further on its way and reached the notions of irrational, imaginary, and complex numbers.

The point in all this, which the reader must carefully note, is, that all the numbers of arithmetic, with the exception of the positive whole numbers, are artificial products of human thought, invented to make the language of arithmetic more flexible, and to ac-

celerate the progress of science. All these numbers lack the attributes of representability.

No man in the world can picture to himself "minus three trees." It is possible, of course, to know that when three trees of a garden have been cut down and carried away, that three are missing, and by substituting for "missing" the inverse notion of "added," we may says, perhaps, that "minus three trees" are added. But this is quite different from the feat of imagining a negative number of trees. We can only picture to ourselves a number of trees that results from actual counting, that is, a positive whole number. Yet, notwithstanding all this, people had not the slightest hesitation in extending the notion of number. Exactly so must it be permitted us in geometry to extend the notion of space, even though such an extension can only be mentally defined and can never be brought within the range of human powers of representation.

In mathematics, in fact, the extension of any notion is admissible, provided such extension does not lead to contradictions with itself or with results which are well established. Whether such extensions are necessary, justifiable, or important for the advancement of science is a different question. It must be admitted, therefore, that the mathematician is justified in the extension of the notion of space as a point-aggregate of three dimensions, and in the introduction of space or point-aggregates of more than three dimensions, and in the employment of them as means of research. Other sciences also operate with things which they do not know exist, and which, though they are sufficiently defined, cannot be perceived by our senses. For example, the physicist employs the ether as a means of investigation, though he can have no sensory knowledge of it. The ether is nothing more than a means which enables us to comprehend mechanically the effects known as action at a distance and to bring them within the range of a common point of view. Without the assumption of a material which penetrates everything, and by means of whose undulations impulses are transmitted to the remotest parts of space, the phenomena of light, of heat, of gravitation, and of electricity would be a jumble of isolated and unconnected mysteries. The assumption of an ether, however, comprises

in a systematic scheme all these isolated events, facilitates our mental control of the phenomena of nature, and enables us to produce these phenomena at will. But it must not be forgotten in such reflections that the ether itself is even a greater problem for man, and that the ether-hypothesis does not solve the difficulties of phenomena, but only puts them in a unitary conceptual shape. Notwithstanding all this, physicists have never had the least hesitation in employing the ether as a means of investigation. And as little do reasons exist why the mathematicians should hesitate to investigate the properties of a four-dimensioned point-aggregate, with the view of acquiring thus a convenient means of research.

III

THE INTRODUCTION OF THE IDEA OF FOUR-DIMENSIONED POINT-AGGREGATES OF SERVICE TO RESEARCH.

From the concession that the mathematician has the right to define and investigate the properties of point-aggregates of more than three dimensions, it does not necessarily follow that the introduction of an idea of this description is of value to science. Thus, for example, in arithmetic, the introduction of operations which spring from involution, as involution and its two inverse operations proceed from multiplication, is undoubtedly permitted. Just as for "a times a times a" we write the abbreviated symbol "a^3," (which we read, a to the third power,) and investigate in detail the operation of involution thus defined, so we might also introduce some shorthand symbol for "a to the a^{th} power to the a^{th} power" and thus reach an operation of the fourth degree, which would regard a as a passive number and the number 3, or any higher number, as the active number, that is, as the number which indicates how often a is taken as the base of a power whose exponent may be a, or "a to the a^{th}," or "a to the a^{th} to the a^{th} power."

But the introduction of such an operation of the fourth degree has proved itself to be of no especial value to mathematics. And the reason is that in the operation of involution the law of commutation does not hold good. In addition, the numbers to be added may be interchanged and the introduction of multiplication is therefore

of great value. So, also, in multiplication the numbers which are combined, that is, the factors, may be changed about in any way, and thus the introduction of involution is of value. But in involution the base and the exponent cannot be interchanged, and consequently the introduction of any higher operation is almost valueless.

But with the introduction of the idea of point-aggregates of multiple dimensions the case is wholly different. The innovation in question has proved itself to be not only of great importance to research, but the progress of science has irresistibly forced investigators to the introduction of this idea, as we shall now set forth in detail.

In the first place, algebra, especially the algebraical theory of systems of equations, derives much advantage from the notion of multiple dimensioned spaces. If we have only three unknown quantities, x, y, z, the algebraical questions which arise from the possible problems of this class admit, as we have above seen, of geometrical representation to the eye. Owing to this possibility of geometrical representation, some certain simple geometrical ideas like "moving," lying in," "intersecting," and so forth, may be translated into algebraical events. Now, no reason exists why algebra should stop at three variable quantities; it must in fact take into consideration any number of variable quantities.

For purposes of brevity and greater evidentness, therefore, it is quite natural to employ geometrical forms of speech in the consideration of more than three variables. But when we do this, we assume, perhaps without really intending to do so, the idea of a space of more than three dimensions. If we have four variable quantities, x, y, z, u, we arrive, by conceiving attributed to each of these four quantities every possible numerical magnitude, at a four-dimensioned manifoldness of numerical quantities, which we may just as well regard as a four-dimensioned aggregate of points. Two equations which exist on this supposition between x, y, z, and u, define two three dimensioned aggregates of points, which intersect, as we may briefly say, in a two-dimensioned aggregate of points, that is, in a surface; and so on. In a somewhat different manner the determination of the contents of a square or a cube by the involution of a

number which stands for the length of its sides, leads to the notion of four-dimensioned structures, and, consequently, to the notion of a four-dimensioned point-space. When we note that a^2 stands for the contents of a square, and a^3 for the contents of a cube, we naturally inquire after the contents of a structure which is produced from the cube as the cube is produced from the square and which also will have the contents a^4. We cannot, it is true, clearly picture to ourselves a structure of this description, but we can, nevertheless, establish its properties with mathematical exactness.* It is bounded by 8 cubes just as the cube is bounded by 6 squares; it has 16 corners, 24 squares, and 32 edges, so that from every corner 4 edges, 6 squares, and 4 cubes proceed, and from every edge 3 squares and 3 cubes.

Yet despite the great service to algebra of this idea of multiple-dimensioned space, it must be conceded that the conception although convenient is yet not indispensable. It is true, algebra is in need of the idea of multiple dimensions, but it is not so absolutely in need of the idea of *point*-aggregates of multiple dimensions.

This notion is, however, necessary and serviceable for a profound comprehension of geometry. The system of geometrical knowledge which Euclid of Alexandria created about three hundred years before Christ, supplied during a period of more than two thousand years a brilliant example of a body of conclusions and truths which were mutually consistent and logical. Up to the present century the idea of elementary geometry was indissolubly bound up with the name of Euclid, so that in England where people adhered longest to the rigid deductive system of the Grecian mathematician, the task of "learning geometry" and "reading Euclid" were until a few years ago identical. Every proposition of this Euclidian system rests on other propositions, as one building-stone in a house rests upon another. Only the very lowest stones, the foundations, were without supports. These are the axioms or fundamental proposi-

* Victor Schlegel, indeed, has made models of the three-dimensional nets of all the six structures which correspond in four-dimensioned space to the five regular bodies of our space, in an analogous manner to that by which we draw in a plane the nets of five regular bodies. Schlegel's models are made by Brill of Darmstadt.

tions, truths on which all other truths are, directly or indirectly, founded, but which themselves are assumed without demonstration as self-evident.

But the spirit of mathematical research grew in time more and more critical, and finally asked, whether these axioms might not possibly admit of demonstration. Especially was a rigid proof sought for the eleventh axiom of Euclid, which treats of parallels.

After centuries of fruitless attempts to prove Euclid's eleventh axiom, Gauss, and with him Bolyai and Lobatschewsky, Riemann and Helmholtz, finally stated the decisive reasons why any attempt to prove the axiom of the parallels must necessarily be futile. These reasons consist of the fact that though this axiom holds good enough in the world-space such as we do and can conceive it, yet three-dimensioned spaces are ideally conceivable though not capable of mental representation, where the axiom does not hold good. The axiom was thus shown to be a mere fact of *observation*, and from that time on there could no longer be any thought of a deductive demonstration of it. In view of the intimate connection, which both in an historical and epistemological point of view exists between the extension of the concept of space and the critical examination of the axioms of Euclid, we must enter at somewhat greater length into the discussion of the last mentioned propositions.

Of the axioms which Euclid premises to his geometry, only the following three are really geometrical axioms:

Eighth axiom: Magnitudes which coincide with one another are equal to one another.

Eleventh axiom: If a straight line meet two straight lines so as to make the two interior angles on the same side of it taken together less than two right angles, these straight lines, being continually produced, shall at length meet on that side on which are the angles which are less than two right angles.

Twelfth axiom: Two straight lines cannot inclose a [finite] space.

The numerous proofs which in the course of time were adduced in demonstration of these axioms, especially of the eleventh, all turn out on close examination to be pseudo-proofs. Legendre drew at-

tention to the fact that either of the following axioms might be substituted for the eleventh:

a) Through a point there can be drawn to a straight line, within the plane which joins the point with the line, one and one line only which shall not intersect the first (parallels) however far the two lines may be produced;

b) If two parallel lines are cut by a third straight line, the interior alternate angles will be equal.

c) The sum of the angles of a triangle is equal to two right angles, that is, to the angle of a straight line or 180°.

By the aid of any one of these three assertions, the eleventh axiom of Euclid may be proved, and, *vice versa*, by the aid of the latter each of the three assertions may be proved, of course with the help of the other two axioms, eight and twelve. The perception that the eleventh axiom does not admit of demonstration without the employment of one of the foregoing substitutes may best be gained from the consideration of congruent figures. Every reader will remember from his first instruction in geometry that the congruence of two triangles is demonstrated by the superposition of one triangle on the other and by then ascertaining whether the two completely coincide, no assumptions being made in the determination except those above mentioned.

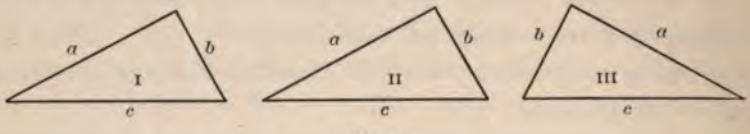

Fig. 1.

In the case of triangles which are congruent as are I and II in the preceding cut, this coincidence may be effected by the simple *displacement* of one of the triangles; so that even a two-dimensional being, supposed to be endowed with powers of reasoning, but only capable of picturing to itself motions within a plane, also might convince itself that the two triangles I and II could be made to coincide. But a being of this description could not convince itself in like manner of the congruence of triangles I and III. It would discover the equality of the three sides and the three angles, but it

could never succeed in so superposing the two triangles on each other as to make them coincide. A three-dimensioned being, however, can do this very easily. It has simply to turn triangle I about one of its sides and to shove the triangle, thus brought into the position of its reflection in a mirror, into the position of triangle III. Similarly, triangles II and III may be made to coincide by moving either out of the plane of the paper around one of its sides as axis and turning it until it again falls in the plane of the paper. The triangle thus turned over can then be brought into the position of the other.

Later on we shall revert to these two kinds of congruence: "congruence by displacement" and "congruence by circumversion." For the present we will start from the fact that it is always possible within the limits of a plane to take a triangle out of one position and bring it into another without altering its sides and angles. The question is, whether this is only possible in the plane, or whether it can also be done on other surfaces.

We find that there are certain surfaces in which this is possible, and certain others in which it is not. For instance, it is impossible to move the triangle drawn on the surface of an egg into some other position on the egg's surface without a distension or contraction of some of the triangle's parts. On the other hand, it is quite possible to move the triangle drawn on the surface of a sphere into any other position on the sphere's surface without a distension or contraction of its parts. The mathematical reason of this fact is, that the surface of a sphere, like the plane, has everywhere the same curvature, but that the surface of an egg at different places has different curvatures. Of a plane we say that it has everywhere the curvature zero; of the surface of a sphere we say it has everywhere a positive curvature, which is greater in proportion as the radius is smaller. There are surfaces also which have a constant negative curvature; these surfaces exhibit at every point in directions proceeding from the same side a partly concave and a partly convex structure, somewhat like the centre of a saddle. There is no necessity of our entering in any detail into the character and structure of the last-mentioned surfaces.

Intimately related with the plane, however, are all those surfaces, which, like the plane, have the curvature zero; in this category belong especially cylindrical surfaces and conical surfaces. A sheet of paper of the form of the sector of a circle may, for example, be readily bent into the shape of a conical surface. If two congruent triangles, now, be drawn on the sheet of paper, which may by displacement be translated the one into the other, these triangles will, it is plain, also remain congruent on the conical surface; that is, on the conical surface also we may displace the one into the other; for though a bending of the figures will take place, there will be no distension or contraction. Similarly, there are surfaces which, like the sphere, have everywhere a constant positive curvature. On such surfaces also every figure can be transferred into some other position without distension or contraction of its parts. Accordingly, on all surfaces thus related to the plane or sphere, the assumption which underlies the eighth axiom of Euclid, that it is possible to transfer into any new position any figure drawn on such surfaces without distortion, holds good.

The eleventh axiom in its turn also holds good on all surfaces of constant curvature, whether the curvature be zero or positive; only in such instances instead of "straight" line we must say "shortest" line. On the surface of a sphere, namely, two shortest lines, that is, arcs of two great circles, always intersect, no matter whether they are produced in the direction of the side at which the third arc of a great circle makes with them angles less than two right angles, or, in the direction of the other side, where this arc makes with them angles of more than two right angles. On the plane, however, two straight lines intersect only on the side where a third straight line that meets them makes with them interior angles less than two right angles.

The twelfth axiom of Euclid, finally, only holds good on the plane and on the surfaces related to it, but not on the sphere or other surfaces which, like the sphere, have a constant positive curvature. This also accounts for the fact that one of the three postulates which we regarded as substitutes for the eleventh axiom, though valid for the plane, is not true for the surface of a sphere; namely,

the postulate that defines the sum of the angles of a triangle. This sum in a plane triangle is two right angles; in a spherical triangle it is more than two right angles, the spherical triangle being greater, the greater the excess the sum of its angles is above two right angles. It will be seen, from these considerations, that in geometries in which curved surfaces and not fixed planes are studied, the axioms of Euclid are either all or partially false.

The axioms of geometry thus having been revealed as facts of experience, the question suggested itself whether in the same way in which it was shown that different two-dimensional geometries were possible, also different three-dimensional systems of geometry might not be developed; and consequently what the relations were in which these might stand to the geometry of the space given by our senses and representable to our mind. As a fact, a three-dimensional geometry can be developed, which like the geometry of the surface of an egg will exclude the axiom that a figure or body can be transferred from any one part of space to any other and yet remain congruent to itself. Of a three-dimensional space in which such a geometry can be developed we say, that it has no constant measure of curvature.

The space which is representable to us, and which we shall henceforth call the *space of experience*, possesses, as our experiences without exception confirm, the especial property that every bodily thing can be transferred from any one part of it to any other without suffering in the transference any distension or any contraction. The space of experience, therefore, has a constant measure of curvature. The question, however, whether this measure of curvature is zero or positive, that is, whether the space of experience possesses the properties which in two-dimensioned structures a plane possesses, or whether it is the three-dimensioned analogon of the surface of a sphere is one which future experience alone can answer. If the space of experience has a constant positive measure of curvature which is different from zero, be the difference ever so slight, a point which should move forever onward in a straight line, or, more accurately expressed, in a shortest line, would sometime, though perhaps after having traversed a distance which to us is inconceivable,

ultimately have to arrive from the opposite direction at the place from which it set out, just as a point which moves forever onward in the same direction on the surface of a sphere must ultimately arrive at its starting point, the distance it traverses being longer the greater the radius of the sphere or the smaller its curvature.

It will seem, at first blush, almost incredible, that the space of experience even *can* have this property. But an example, which is the historical analogon of this modern transformation of our conceptions, will render the idea less marvellous. Let us transport ourselves back to the age of Homer. At that time people believed that the earth was a great disc surrounded on all sides by oceans which were conceived to be in all directions infinitely great. Indeed, for the primitive man, who has never journeyed far from the place of his birth, this is the most natural conception. But imagine now that some scholar had come, and had informed the Homeric hero Ulysses that if he would travel forever on the earth in the same direction he would ultimately come back to the point from which he started; surely Ulysses would have gazed with as much astonishment upon this scholar as we now look upon the mathematician who tells us that it is possible that a point which moves forever onward in space in the same direction may ultimately arrive at the place from which it started. But despite the fact that Ulysses would have regarded the assertion of the scholar as false because contradictory to his familiar conceptions, that scholar, nevertheless, would have been right; for the earth is not a plane but a spherical surface. So also the mathematician might be right who bases this more recent strange view on the possible fact that the space of experience may have a measure of curvature which is not exactly zero but slightly greater than zero. If this were really the case, the *volume* of the space of experience, though very large, would, nevertheless, be finite; just as the real spherical surface of the earth as contrasted with the Homeric plane surface is finite, having so and so many square miles. When the objection is here made that a finiteness of space is totally at variance with our modes of thought and conceptions, two ideas, "infinitely great" and "unlimited," are confounded. All that is at variance with our practical conceptions is that space can anywhere

have a limit; not that it may possibly be of tremendous but finite magnitude.

It will now be asked if we cannot determine by actual observation whether the measure of curvature of experiential space is exactly zero or slightly different therefrom. The theorem of the sum of the angles of a triangle and the conclusions which follow from this theorem do indeed supply us with a means of ascertaining this fact. And the results of observation have been, that *the measure of curvature of space is in all probability exactly equal to zero or if it is slightly different from zero it is so little so that the technical means of observation at our command and especially our telescopes are not competent to determine the amount of the deviation.* More, we cannot with any certainty say.

All these reflections, to which the criticism of the hypotheses that underlie geometry long ago led investigators, compel us to institute a comparison between the space of experience and other three-dimensioned aggregates of points (spaces), which we cannot mentally represent but can in thought and word accurately define and investigate. As soon, however, as we are fully involved in the task of accurately investigating the properties of three-dimensional aggregates of points, we similarly find ourselves forced to regard such aggregates as the component elements of a manifoldness of more than three dimensions. In this way the exact criticism of even ordinary geometry leads us to the abstract assumption of a space of more than three dimensions. And as the extension of every idea gives a clearer and more translucent form to the idea as it originally stood, here too the idea of multiple-dimensioned aggregates of points and the investigation of their properties has thrown a new light on the truths of ordinary geometry and placed its properties in clearer relief. Amid the numerous examples which show how the notion of a space of multiple-dimensions has been of great service to science in the investigation of three-dimensioned space, we shall give one a place here which is within the comprehension of non-mathematicians.

Imagine in a plane two triangles whose angles are denoted by pairs of numbers—namely, by 1-2, 1-3, 1-4, and 2-5, 3-5, 4-5.

(See Fig. 2.) Let the two triangles so lie that the three lines which join the angles 1-2 and 2-5, 1-3 and 3-5, and 1-4 and 4-5 intersect at a point, which we will call 1-5. If now we cause the sides of the triangles which are opposite to these angles to intersect, it will be found that the points of intersection so obtained possess the peculiar property of lying all in one and the same straight line. The point of intersection of the connection 1-3 and 1-4 with the connection 4-5 and 3-5 may appropriately be called 3-4. Similarly, the point of intersection 2-4 is produced by the meeting of 4-5, 2-5 and 1-2, 1-4; and the point of intersection 2-3, by the meeting of 1-3, 1-2 and 3-5, 2-5. The statement, that the three points of intersection 3-4, 2-4, 2-3, thus obtained, lie in one straight line, can be proved by the principles of plane geometry only with difficulty and great circumstantiality. But by resorting to the three-dimensional space of experience, in which the plane of the drawing lies, the proposition may be rendered almost self-evident.

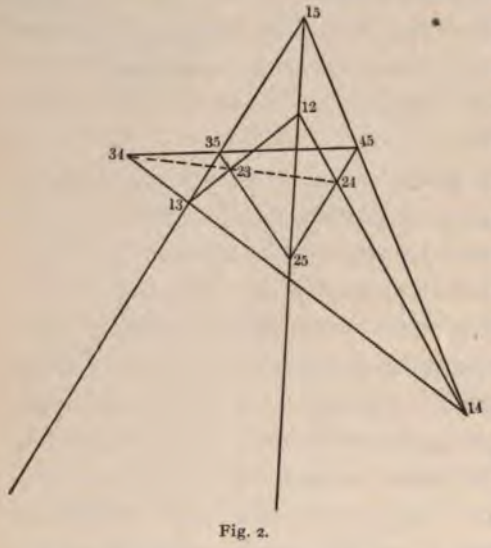

Fig. 2.

To begin with, imagine any five points in space which may be denoted by the numbers 1, 2, 3, 4, 5; then imagine all the possible ten straight lines of junction drawn between each two of these points, namely, 1-2, 1-3 . . . . 4-5; and finally, also, all the ten planes of junction of every three points described, namely, the plane 1-2-3, 1-2-4, ... 3-4-5. A spatial figure will thus be obtained, whose ten straight lines will meet some interposed plane in ten points whose relative positions are exactly those of the ten points above described. Thus, for example, on this plane the points 1-2, 1-3, and 2-3 will lie in a straight line, for through the three spatial points 1, 2, 3, a plane can

be drawn which will cut the plane of a drawing in a straight line. The reason, therefore, that the three points 3-4, 2-4, 2-3, also must ultimately lie in a straight line, consists in the simple fact that the plane of the three points 2, 3, 4, must cut the plane of the drawing in a straight line. The figure here considered consists of ten points of which sets of three so lie ten times in a straight line that conversely from every point also three straight lines proceed.

Now, just as this figure is a section of a complete three-dimensional pentagon, so another remarkable figure, of similar properties, may be obtained by the section of a figure of four-dimensioned space. Imagine, namely, six points, 1, 2, 3, 4, 5, 6, situated in

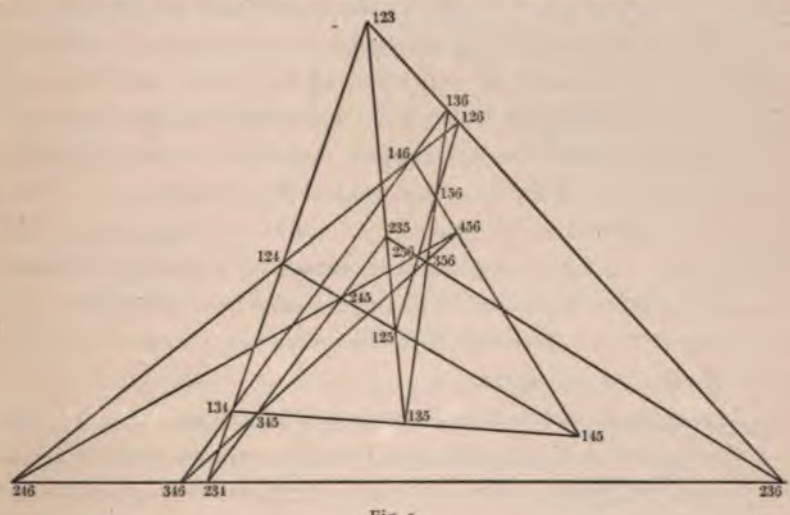

Fig. 3.

this four-dimensioned space, and every three of them connected by a plane, and every four of them by a three-dimensioned space. We shall obtain thus twenty planes and fifteen three-dimensioned spaces which will cut the plane in which the figure is to be produced in twenty points and fifteen rays which so lie that each point sends out three rays and every ray contains four points. (See Fig. 3.) Figures of this description, which are so composed of points and rays that an equal number of rays proceed from every point and an equal number of points lie in every ray, are called *configurations*. Other configurations may, of course, be produced, by taking a different

number of points and by assuming that the points taken lie in a space of different or even higher dimensions. The author of this article was the first to draw attention to configurations derived from spaces of higher dimensions. As we see, then, the notion of a space of more than three dimensions has performed important work in the investigations of common plane geometry.

In conclusion, I should like to add a remark which Cranz makes regarding the application of the idea of multiple-dimensioned space to theoretical chemistry. (See the treatise before cited.) In chemistry, the molecules of a compound body are said to consist of the atoms of the elements which are contained in the body, and these are supposed to be situated at certain distances from one another, and to be held in their relative positions by certain forces. At first, the centres of the atoms were conceived to lie in one and the same plane. But Wislicenus was led by researches in paralactic acid to explain the differences of isomeric molecules of the same structural formulæ by the different positions of the atoms in *space*. (Compare "La chimie dans l'espace" by van't Hoff, 1875, preface by J. Wislicenus). In fact four points can always be so arranged in space that every two of them may have any distance from each other; and the change of one of the six distances does not necessarily involve the alteration of any other.

But suppose our molecule consists of five atoms? Four of these may be so placed that the distance between any two of them can be made what we please. But it is no longer possible to give the fifth atom a position such that each of the four distances by which it is separated from the other atoms may be what we please. Quite the contrary, the fourth distance is dependent on the three remaining distances; for the space of experience has only three dimensions. If, therefore, I have a molecule which consists of five atoms I cannot alter the distance between two of them without at least altering some second distance. But if we imagine the centres of the atoms placed in a four-dimensioned space, this can be done; all the ten distances which may be conceived to exist between the five points will then be independent of one another. To reach the same result

in the case of six atoms we must assume a five-dimensional space; and so on.

Now, if the independence of all the possible distances between the atoms of a molecule is absolutely required by theoretical chemical research, the science is really compelled, if it deals with molecules of more than four atoms, to make use of the idea of a space of more than three dimensions. This idea is, in this case, simply an instrument of research, just as are, also, the ideas of molecules and atoms—means designed to embrace in an obvious and systematic form the phenomena of chemistry and to discover the conditions under which new phenomena can be evoked. Whether a four-dimensioned space really exists is a question whose insolubility cannot prevent research from making use of the idea, exactly as chemistry has not been prevented from making use of the notion of atom, although no one really knows whether the things we call atoms exist or not.

IV.

REFUTATION OF THE ARGUMENTS ADDUCED TO PROVE THE EXISTENCE OF A FOUR-DIMENSIONED SPACE INCLUSIVE OF THE VISIBLE WORLD.

The considerations of the preceding section will have convinced the cultured non-mathematician of the service which the theory of multiple-dimensioned spaces has done, and bids fair to do, for geometrical research. In addition thereto is the consideration that every extension of one branch of mathematical science is a constant source of beneficial and helpful influence to the other branches. The knowledge, however, that mathematicians can employ the notion of four-dimensioned space with good results in their researches, would never have been sufficient to procure it its present popularity; for every man of intelligence has now heard of it, and, in jest or in earnest, often speaks of it. The knowledge of a four-dimensioned space did not reach the ears of cultured non-mathematicians until the consequences which the spiritualists fancied it was permissible to draw from this mathematical notion were publicly known. But it is a tremendous step from the four-dimensioned space of the mathemati-

cians to the space from which the spirit-friends of the spiritualistic mediums entertain us with rappings, knockings, and bad English. Before taking this step we will first discuss the question of the real existence of a four-dimensional space, not judging the question whether this space, if it really does exist, is inhabited by reasonable beings who consciously act upon the world in which we exist.

Among the reasons which are put forward to prove the existence of a four-dimensional space containing the world, the least reprehensible are those which are based on the existence of symmetry. We spoke above of two triangles in the same plane which have all their sides and angles congruent, but which cannot be made to coincide by simple displacement within the plane; but we saw that this

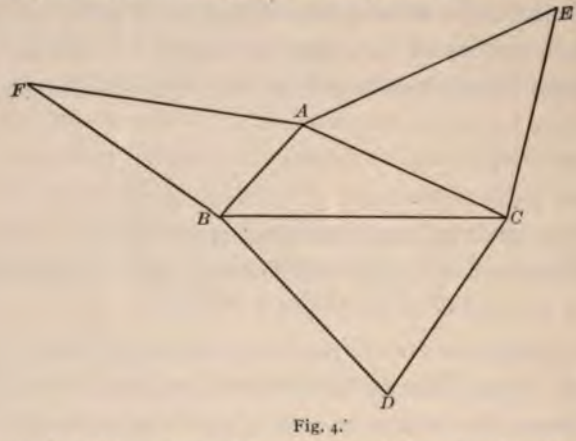

Fig. 4.

coincidence could be effected by holding fast one side of one triangle and moving it out of its plane until it had been so far turned round that it fell back into its plane. Now something similar to this exists in space. Cut two figures, exactly like that of Fig. 4, out of a piece of paper, and turn the triangle ABF about the side AB, ACE about the side AC, BCD about the side BC, and in one figure above and in the other below; then in both cases the points D, E, F will meet at a point, because AE is equal to AF, BF is equal to BD, CD is equal to CE. In this manner we obtain two pyramids which in all lengths and all angles are congruent, yet which cannot, no matter how we try, be made to coincide, that is, be so fitted the one into the other that they shall both stand as one pyra-

mid. But the *reflected* image of the one could be brought into coincidence with the other. Two spatial structures whose sides and angles are thus equal to each other, and of which each may be viewed as the reflected image of the other, are called *symmetrical*. For instance, the right and the left hand are symmetrical; or, a right and a left glove. Now just as in two dimensions it is impossible by simple displacement to bring into congruence triangles which like those above mentioned can only be made to coincide by circumversion, so also in three dimensions it is impossible to bring into congruence two symmetrical pyramids. Careful mathematical reflection, however, declares, that this could be effected if it were possible, while holding one of the surfaces, to move the pyramid out of the space of experience, and to turn it round through a four-dimensioned space until it reached a point at which it would return again into our experiential space. This process would simply be the four-dimensional analogon of the three-dimensional circumversion in the above-mentioned case of the two triangles. Further, the interior surfaces in this process would be converted into exterior surfaces, and *vice versa*, exactly as in the circumversion of a triangle the anterior and posterior sides are interchanged. If the structure which is to be converted into its symmetrical counterpart is made of a flexible material, the interchange mentioned of the interior and exterior surfaces may be effected by simply turning the structure inside out; for example, a right glove may thus be converted into a left glove.

Now from this truth, that every structure can be converted by means of a four-dimensional space inclusive of the world, into a structure symmetrical with it, it has been sought to establish the probability of the real existence of a four-dimensioned space. Yet it will be evident, from the discussions of the preceding section, that the only inference which we can here make is, that the idea of a four-dimensioned space is competent, from a mathematical point of view, to throw some light upon the phenomena of symmetry. To conclude from these facts that a space of this kind really exists, would be as daring as to conclude from the fact that the uniform angular velocity of the apparent motions of the fixed stars is expli-

cable from the assumption of an axial motion of the firmament, that the fixed stars are really rigidly placed in a celestial sphere rotating about its axis. It must not be forgotten that our comprehension of the phenomena of the real world consists of two elements: first, of that which the things really are; and, second, of that by which we rationally apprehend the things. This latter element is partly dependent on the sum of the experiences which we have before acquired, and partly on the necessity, due to the imperfection of reason, of our embracing the multitudinous isolated phenomena of the world into categories which we ourselves have formed, and which, therefore, are not wholly derived from the phenomena themselves, but to a great extent are dependent on us.

Besides geometrical reasons, Zöllner has also adduced cosmological reasons to prove the existence of a four-dimensional space. To these reasons belong especially the questions whether the number of the fixed stars is infinitely great, whether the world is finite or infinite in extension, whether the world had a beginning or will have an end, whether the world is not hastening towards a condition of equilibrium or dead level by the universal distribution of its matter and energy; the problems, also, of gravitation and action at a distance; and finally, the questions concerning the relations between the phenomena in the world of sense-perception to the unknown things-in-themselves. All these questions which can be decided in no definite sense, led Zöllner and his followers to the assumption that a four-dimensioned space inclusive of the space of experience must really exist. But more careful reflection will show that this assumption does not dispose of the difficulties but simply displaces them into another realm. Furthermore, even if four-dimensioned space did unravel and make clear all the cosmological problems which have bothered the human mind, still, its existence would not be proved thereby; it would yet remain a mere hypothesis, designed to render more intelligible to a being who can only make experiences in a three-dimensional space, the phenomena therein which are full of mystery to it. A four-dimensioned space would in such case possess for the metaphysician a value similar to that which the ether possesses for the physicist. Still more convincing than these cos-

mological reasons to the majority of men is the physio-psychological reason drawn from the phenomena of vision which Zöllner adduces. Into this main argument we will enter in more detail.

When we "see" an object, as we all know, the light which proceeds or is reflected therefrom produces an image on the retina of our eye; this image is conducted to our consciousness by means of the optical nerve, and our reason draws therefrom an inference respecting the object. When, now, we look at a square whose sides are a decimetre in length, and whose centre is situated at the distance of a metre from the pupil of our eye, an image is produced on the retina. But exactly the same image will be produced there if we look at a square whose sides are parallel to the sides of the first square but two decimetres in length, and whose centre is situated at a distance of two metres from the pupil of the eye. Proceeding thus further, we readily discover that an eye can perceive in any length or line only the ratio of its magnitude to the distance at which it is situated from it, and that generally a three-dimensional world must appear to the eye two-dimensional, because all points which lie behind each other in the direction outwards from the eye produce on the retina only one image. This is due to the fact that the retinal images are themselves two-dimensional; for which reason, Zöllner says, the world must appear to a child as two-dimensional, if it be supposed to live in a primitive condition of unconscious mental activity. To such a child two objects which are moving the one behind the other, must appear as suffering displacement on a surface, which we conceive behind the objects, and on which the latter are projected. In all these apparent displacements, coincidences and changes of form also are effected. All these things must appear puzzling to a human being in the first stages of its development, and the mind thus finds itself, as Zöllner further argues, in the first years of childhood forced to adopt a hypothesis concerning the constitution of space and to assume that the world is three-dimensional, although the eye can really perceive it as only two-dimensional. Zöllner then further says, that in the explanation of the effects of the external world, man constantly finds this hypothesis of his childish years confirmed, and that in this way it has become in his mind

so profound a conviction that it is no longer possible for him to think it away. Consonant with this argumentation, also, is Zöllner's remark, that the same phenomenon has presented itself in astronomical methods of knowledge. To explain the movements of the planets, which appear to describe regular paths on the surface of a celestial sphere, we were compelled in the solution of the riddles which these motions presented, to assume in the structure of the heavens a dimension of "depth," and the complicated motions in the two-dimensioned firmament were converted into very simple motions in three-dimensioned space. Zöllner also contends that our conception of the entire visible world as possessed of three dimensions is a product of our reason, which the mind was driven to form by the contradictions which would be presented to it on the assumption of only two dimensions by the perspective distortions, coincidences, and changes of magnitude of objects. When a child moves its hand before its eyes, turns it, brings it nearer, or pushes it farther away, this child successively receives the most various impressions on the surface of its retina of one and the same object of whose identity and constancy its feelings offer it a perfect assurance. If the child regarded the changeable projection of the hand on the surface of the retina as the real object, and not the hand which lies beyond it, the child would constantly be met with contradictions in its experience, and to avoid this it makes the hypothesis that the space of experience is three-dimensional. Zöllner's contention is, therefore, that man originally had only a two-dimensional intuition of space, but was forced by experience to represent to himself the objects which on the retinal surface appeared two-dimensional, as three-dimensional, and thus to transform his two-dimensional space-intuition into a three-dimensional one. Now, in exactly the same way, according to Zöllner's notion, will man, by the advancement and increasing exactness of his knowledge of the phenomena of the outer world, also be compelled to conceive of the material world as a "shadow cast by a more real four-dimensional world," so that these conceptions will be just as trivial for the people of the twentieth century as since Copernicus's time the explanation of the mo-

tions of the heavenly bodies by means of a three-dimensional motion has been.

Zöllner's arguments from the phenomena of vision may be refuted as follows: In the first place it is incorrect to say that we see the things of the external world by means of two-dimensional retinal images. The light which penetrates the eye causes an irritation of the optical nerves, and any such effect which, though it be not powerful, is, nevertheless, a mechanical one, can only take place on things which are material. But material things are always three-dimensional. The effect of light on the sensitive plates of photography can with just as little justice be regarded as two-dimensional. Our senses can have perception of nothing but three-dimensional things, and this perception is effected by forces which in their turn act on three-dimensional things, namely, our sensory nerves. It is wrong to call an image two-dimensional, for it is only by abstraction that we can conceive of a thickness so growing constantly smaller and smaller as to admit of our regarding a three-dimensional picture as two-dimensional, by giving it in mind a vanishingly small thickness. It is also wrong to say, as Zöllner says, that when we see the shadow of a hand which is cast upon a wall we see something two-dimensional. What we really perceive is that no light falls upon our eye from the region included by the shadow, while from the entire surrounding region light does fall on our eye. But this light is reflected from the material particles which form the surface of the wall, that is, from three-dimensional particles of matter. We must always remember that our eye communicates to us only three-dimensional knowledge, and that for the comprehension of anything which has two, one, or no dimensions, *a purely intellectual act of abstraction must be added to the act of perception.* When we imagine we have made a lead-pencil mark on paper, we have, exactly viewed, simply heaped along side of each other little particles of graphite in such a manner that there are by far fewer graphite particles in the lateral and upward directions than there are in the longitudinal direction, and thus our reason arrives by abstraction at the notion of a straight line. When we look at an object, say a cube of wood, we recognise the object as three-dimensional, and it is only by abstraction that we

can conceive of its two-dimensional surfaces, of its twelve one-dimensional edges, and of its eight no-dimensional corners. For we reach the perception of its surface, for example, solely by reason of the fact that the material particles which form the cube prevent the transmission of light, and reflect it, whereby a part of the light reflected from every material particle strikes our eye. Now, by thinking exclusively of those material particles which are reflected, in contrariety to the empty space without and the hidden and therefore non-reflected particles within, we form the notion of a surface.

It is evident from this, that all that we perceive is three-dimensional, that we cannot come at anything two-dimensional without an intellectual abstraction, and that, therefore, we cannot conceive of anything two-dimensional exerting effects upon material things. But this fact is a refutation of the retinal argument of Zöllner. If vision consisted wholly and exclusively in the creation of a two-dimensioned image, the things which take place in the world could never come into our consciousness. The child, therefore, does not originally apprehend the world, as Zöllner says, as two-dimensional; on the contrary, it apprehends it either not at all, or it apprehends it as three-dimensional. Of course the child must first "learn how" to see. It is found from the observation of children during the first months of their lives, and of the congenitally blind, who have suddenly acquired the power of vision by some successful operation, that seeing does not consist alone in the irritations which arise in the optic nerves, but also in the correct interpretation of these irritations by reason. This correct interpretation, however, can be accomplished only by the accumulation of a considerable stock of experience. Especially must the recognition of the distance of the object seen, be gradually learned. In this, two things are especially helpful; first, the fact that we have two eyes and, consequently, that we must feel two irritations of the optic nerves which are not wholly alike; and secondly, the fact that we are enabled by our power of motion and our sense of touch to convince ourselves of the distance and form of the bodies seen. The question now arises, what sort of an intuition of space would a creature have that had only one eye, that could neither move itself nor its eye, and also possessed no

peripheral nerves. According to Zöllner's view, this creature could, owing to its two-dimensional retinal images, only have a two-dimensional intuition of space. The author's opinion, however, is, that such a creature could not see at all, as it has no possibility of collecting experiences which are adapted in any way to interpreting the effects of things on its retina. The light which proceeded from the objects roundabout and fell on the retina could produce no other effect on the being than that of a wholly intelligible irritation, or, perhaps, even pain.

The reflections presented sufficiently show that neither the phenomena of symmetry nor the retinal images of the objects of vision necessarily force upon us the assumption of a four-dimensioned space. If the material world should ever present problems which could not in the progress of knowledge be solved in a natural way, the assumption that a four-dimensional space containing the world exists would also be incompetent to resolve the difficulties presented; it would simply convert these difficulties into others, and not dispose of the problems but simply displace them to another world. Yet the question might be asked, Is the existence of a four-dimensional space really *impossible*? To answer this question, we must first clearly know what we mean by "exist." If existence means that the intellectual *idea* of a thing can be formed and that this idea shall not lead to contradictions with other well-established ideas and with experience, we have only to say that four-dimensioned space does exist, as the arguments adduced in sections II and III have rendered plain. If, namely, the space of four dimensions did not exist as a clear idea in the minds of mathematicians, mathematicians could certainly not have been led by this idea to results which are recognised by the senses as true, and which really take place in our own representable space. But if existence means "material actuality" we must say that we neither now nor in the future can know anything about it. For we know material actuality only as three-dimensional, our senses can only make three-dimensional experiences, and the inferences of our reason, although they can well abstract from material things, can never ascend to the point of explaining a four-dimensional materiality. Just as little, therefore, as we can

locally fix the idea of a two-dimensional material world, as little can we substantiate the notion of a four-dimensioned material existence.

V.

EXAMINATION OF THE HYPOTHESIS CONCERNING THE EXISTENCE OF FOUR-DIMENSIONAL SPIRITS.

In connection with the belief that the visible world is contained in a four-dimensioned space, Zöllner and his adherents further hold that this higher space is inhabited by intelligent beings who can act consciously and at will on the human beings who live in experiential space. To invest this opinion with greater strength Zöllner appealed to the fact that the greatest thinkers of antiquity and of modern times were either wholly of this opinion or at least held views from which his contentions might be immediately derived. Plato's dialogue between Socrates and Glaukon in the seventh book of the Republic, is evidence, says Zöllner, that this greatest philosopher of antiquity possessed some presentiment of this extension of the notion of space. Yet any one who has connectedly studied and understood Plato's system of philosophy must concede that the so-called "ideas" of the Platonic system denote something wholly different from what Zöllner sees in them or pretends to see. Zöllner says that these Platonic ideas are spatial objects of more than three dimensions and represent "real existence" in the same sense that the material world, as contrasted with the images on the retina, represents it. Zöllner similarly deals with the Kantian "thing-in-itself," which is also regarded as an object of higher dimensions.

To show Kant in the light of a predecessor, Zöllner quotes the following passage from the former's "Träume eines Geistersehers, erläutert durch Träume der Metaphysik" (1766, Collected Works, Vol. VII, page 32 et seqq.): "I confess that I am very much in-"clined to assert the existence of immaterial beings in the world, "and to rank my own soul as one of such a class. It appears, there "is a spiritual essence existent which is intimately bound up with "matter but which does not act on those forces of the elements by "which the latter are connected, but upon some internal principle

"of its own condition. It will, in the time to come—I know not "when or where—be proved, that the human soul, even in this life, "exists in a state of uninterrupted connection with all the imma- "terial natures of the spiritual world; that it alternately acts on "them and receives impressions from them, of which, as a human "soul, it is not, in the normal state of things, conscious. It would "be a great thing, if some such systematic constitution of the spirit- "ual world, as we conceive it, could be deduced, not exclusively "from our general notion of spiritual nature, which is altogether too "hypothetical, but from some real and universally admitted obser- "vations,—or, for that matter, if it could even be shown to be prob- "able."

What Kant really asserts here is, first, the partly independent and partly dependent existence of the soul, and of spiritual beings generally, on matter, and, second, that spiritual beings have some common connection with and mutually influence one another. This contention, which is that of very many thinkers, does not, however, entail the consequence that the "transcendental subject of Kant" must be four-dimensional, as Zöllner asserts it does. Kant never even hinted at the theory that the psychical features of the world owe their connection with the material features to the fact that they are four-dimensional and, therefore, include the three-dimensional. Is it a necessary conclusion that if a thing exists and is not three-dimensional, as is the case with the soul, that it is therefore four-dimensional? Can it not in fact be so constituted that it is wholly meaningless to speak of dimensions at all in connection with it?

Yet still more strongly than the words of Plato and Kant do certain utterances of the mathematicians Gauss and Riemann speak in favor of Zöllner's hypothesis. S. v. Waltershausen relates of Gauss in his "Gruss zum Gedächtnis," (Leipsic, 1856,) that Gauss had often remarked that the three dimensions of space were only a specific peculiarity of the human mind. We can think ourselves, he said, into beings who are only conscious of two dimensions; similarly, perhaps, beings who are above and outside our world may look down upon us; and there were, he continued, in a jesting tone,

a number of problems which he had here indefinitely laid aside, but hoped to treat in a superior state by superior geometrical methods. Leaving aside this jest, which quite naturally suggested itself, the remarks of Gauss are quite correct. We possess the power to abstract and can think, therefore, what kind of geometry a being that is only acquainted with a two-dimensional world would have; for instance, we can imagine that such a being could not conceive of the possibility of making two triangles coincide which were congruent in the sense above explained, and so on. So, also, we can understand that a being who has control of four dimensions can only conceive of a geometry of four-dimensional space, yet may have the capacity of thinking itself into spaces of other dimensions. But it does not follow from this that a four-dimensional space exists, let alone that it is inhabited by reasonable beings.

Riemann, on the other hand, speaks directly of a world of spirits. In his "Neue mathematische Principien der Naturphilosophie" he puts forth the hypothesis that the space of the world is filled with a material that is constantly pouring into the ponderable atoms, there to disappear from the phenomenal world. In every ponderable atom, he says, at every moment of time, there enters and appears a determinate amount of matter, proportional to the force of gravitation. The ponderable bodies, according to this theory, are the place at which the spiritual world enters and acts on the material world. Riemann's world of spirits, the sole office of which is to explain the phenomenon of gravitation as a force governing matter, is, though, essentially different from the spiritual world of Zöllner, the function of which is to explain supposed supersensuous phenomena which stand in the most glaring contradiction with the established known laws of the material world.

Besides this appeal to the testimony of eminent men like Plato, Kant, Gauss, and Riemann, the scientific prophet of modern spiritualism also bases his theory on the belief, which has obtained at all times and appeared in various forms among all peoples, that there exist in the world forces which at times are competent to evoke phenomena that are exempt from the ordinary laws of nature. We have but to think of the phenomena of table-turning which once ex-

cited the Chinese as much as it has aroused, during the last few decades, the European and American worlds; or of the divining-rod, by whose help our forefathers sought for water, in fact, as we do now in parts of Europe and America.

Cranz, in his essay on the subject, divides spiritualistic phenomena into physical and intellectual. Of the first class he enumerates the following: the moving of chairs and tables; the animation of walking-sticks, slippers, and broomsticks; the miraculous throwing of objects; spirit-rappings (Luther heard a sound in the Wartburg, "as if three score casks were hurled down the stairs"); the ecstatic suspension of persons above the floor; the diminution of the forces of gravity; the ordeals of witches; the fetching of wished-for objects; the declination of the magnetic needle by persons at a distance; the untying of knots in a closed string; insensibility to injury and exemption therefrom when tortured, as in handling red-hot coals, carrying hot irons, etc.; the music of invisible spirits; the materialisations of spirits or of individual parts of spirits (the footprints in the experiments of Slade, photographed by Zöllner); the double appearance of the same person; the penetration of matter (of closed doors, windows, and so forth). As numerous also is the selection presented by Cranz of intellectual phenomena, namely: spirit-writing (Have's instrument for the facilitation of intercourse with spirits), the clairvoyance and divination of somnambulists, of visionary, ecstatic, and hypnotised persons, prompted or controlled by narcotic medicines, by sleeping in temples, by music and dancing, by ascetic modes of life and residence in barren localities, by the exudations of the soil and of water, by the contemplation of jewels, mirrors, and crystal-pure water, and by anointing the finger-nails with consecrated oil. Also the following additional intellectual phenomena are cited: increased eloquence or suddenly acquired power of speaking in foreign languages; spirit-effects at a distance; inability to move, transferences of the will, and so forth.

All these phenomena, presented with the aspect of truth, and associated more or less with trickery, self-deception, and humbug, are adduced by the spiritualists to substantiate the belief in a world of spirits which consciously and purposely take part in the events

of the material world, and that these phenomena may be sufficiently and consistently explained by the effects of the activity of such a world. It is impossible for us to discuss and put to the test here the explanations of all these supersensuous phenomena. Anything and everything can be explained by spirits who act at will upon the world. There are only a few of these phenomena, namely, clairvoyance and Slade's experiments, whose explanations are so intimately connected with our main theme, the so-called fourth dimension, that they cannot be passed over.

First, with respect to clairvoyance, the American visionary Davis describes the experiences which he claims to have made in this condition, induced by "magnetic sleep," as follows:* "The sphere of my vision now began to expand. At first, I could only clearly discern the walls of the house. At the start they seemed to me dark and gloomy; but they soon became brighter and finally transparent. I could now see the objects, the utensils, and the persons in the adjoining house as easily as those in the room in which I sat. But my perceptions extended further still; before my wandering glance, which seemed to control a great semi-circle, the broad surface of the earth, for hundreds of miles about me, grew as transparent as water, and I saw the brains, the entrails, and the entire anatomy of the beasts that wandered about in the forests of the eastern hemisphere, hundreds and thousands of miles from the room in which I sat." The belief in the possibility of such states of clairvoyance is by no means new. Alexander Dumas made use of it, for example, in his "Mémoires d'un médicin," in which Count Balsamo, afterwards called Cagliostro, is said to possess the power of transforming suitable persons into this wonderful condition and thus to find out what other persons at distant places are doing. Zöllner explains clairvoyance by means of the fourth dimension thus:

A man who is accustomed to viewing things on a plain is supposed to ascend to a considerable height in a balloon. He will there enjoy a much more extended prospect than if he had remained on the plain below, and will also be able to signal to greater dis-

* Quoted by Cranz.

tances. The plain, that is, the two-dimensioned space, is accordingly viewed by him from points outside of the plain as "open" in all directions. Exactly so, in Zöllner's theory, must three-dimensioned spaces appear, when viewed from points in four-dimensioned space, namely, as "open"; and the more so in proportion as the point in question is situated at a greater distance from the place of our body, or in proportion as the soul ascends to a greater height in this fourth dimension. Zöllner thus explains clairvoyance as a condition in which the soul has displaced itself out of its three-dimensioned space and reached a point which with respect to this space is four-dimensionally situated and whence it is able to contemplate the three-dimensional world without the interference of intervening obstacles.

The following remark is to be made to this explanation. The reason why we have a better and more extended view from a balloon than from places on the earth is simply this, that between the suspended balloon and the objects seen at a distance nothing intervenes but the air, and air allows the transmission of light, whereas, at the places below on the earth there are all kinds of material things about the observer which prevent the transmission of light and either render difficult or absolutely impossible the sight of things which lie far away. In the same way, also, from a point in four-dimensioned space, a three-dimensional object will be visible only provided there are no obstacles intervening. If, therefore, this awareness of a distant object is a real, actual vision by means of a luminous ray which strikes the eye, there is contained in the explanation of Zöllner the tacit assumption that the medium with which the four-dimensional world is filled is also pervious to light exactly as the atmosphere is.

The theory that there are four-dimensional spirits who produce the phenomena cited by the spiritualists received special support from the experiments which the prestidigitateur Slade, who claimed he was a spiritualistic medium, performed before Zöllner. Of these experiments we will speak of the two most important, the experiment with the glass sphere and the experiment with the knots. To explain the connection of the glass sphere experiment with the fourth

dimension, we must first conceive of two-dimensional reasoning beings, or, let us say, two-dimensional worms, living and moving in a plane. For a creature of this kind it will be self-evident that there are no other paths between two points of its plane than such as lie within the plane. It must, accordingly, be beyond the range of conception of this worm, how any two-dimensional object which lies within a circle in its space can be brought to any other position in its space outside the circle without the object passing through the barriers formed by the circle's circumference. But if this worm could procure the services of a three-dimensional being, the transportation of the object from a position within the circle to any position outside it could be effected by the three-dimensional being simply taking the object *out of* the plane and placing it at the desired point. This object, therefore, would, in an inexplicable manner, suddenly disappear before the eyes of the worms who were assembled as spectators, and after the lapse of an interval of time would again appear outside the circle without having passed at any point through the circle's circumference. If now we add another dimension, we shall derive from this trick, which is wholly removed from the sense-perception of the flattened worms, the following experiment, which is wholly beyond the perception of us human beings. Inside a glass sphere, which is closed all around, a grain of corn is placed; the problem is to transport the corn to some place outside the sphere without passing through the glass surface. Now we should be able to perform this trick if some four-dimensional being would render us the same aid that we before rendered the two-dimensional worm. For the four-dimensional being could take the grain of corn into his four-dimensional space and then replace it in our space in the desired spot outside of the glass sphere. Slade performed this trick before Zöllner. Its mere performance sufficed to convince this latter investigator that Slade had here made use of a four-dimensional agent, who, in respect of power of motion, controlled his four-dimensional space as we do our three-dimensional space. It never occurred to Zöllner that this experiment was the cleverly executed trick of a prestidigitateur, or, as it would at once occur to us, that the whole thing was a sensory illusion. The fact

that we cannot explain a trick easily and naturally does not irrevocably prove that it is accomplished by other means than those which the world of matter presents.

Still better known than this last performance is Slade's experiments with knots. To explain this in connection with the fourth dimension, we must resort again to the plane and the flat worm inhabiting it. To two parallel lines in a plane let the two ends of a third line, which has a double point, that is, intersects itself once, be attached. Our flat worm would not be able to untie the loop formed by the doubled third line, which we will call a string, because it cannot execute motions in three dimensions. If, therefore, a two-dimensional prestidigitateur should appear and accomplish the trick of untying this loop without removing the two ends of the string from the parallel lines, he will have accomplished for our flat worm a supersensuous experiment. A human being engaged in the service of the prestidigitateur could execute for him the experiment by simply lifting the string a little out of the plane, pulling it taut, and placing it back again. This suggests the following analogous experiment for three-dimensional beings. The two ends of a string in which a common knot has been made are sealed to the opposite walls of a room. The problem is to untie this knot without breaking the seals at the two ends of the string. Everybody knows that this problem is not soluble, but it may be calculated mathematically that the knot in the string can be untied as easily by motions in a fourth dimension of space as in the experiment above described the knot in the two-dimensional string was untied by a three-dimensional motion. Now as Slade untied the knot before Zöllner's eyes without apparently making any use of the ends fastened in the walls, Zöllner was still more strongly confirmed in the view that Slade had power over spirits who performed the experiments for him.

Still more far-reaching is the theory of Carl du Prel concerning the relations of the material and the four-dimensional world. (Compare his numerous essays in the spiritualistic magazine *Sphinx*.) Just as the shadows of three-dimensional objects cast on a wall are controlled in their movements by the things whose projections they are, in the same way it is claimed does there exist back of every-

thing of this sense-perceptible world a real transcendental and four-dimensional "thing-in itself" whose projection in the space of experience is what we falsely regard as the independent thing. Thus every man besides existing in his terrestrial self also exists in a spiritual or astral self which constantly accompanies him in his walks through life and whose existence is especially proclaimed in states of profound sleep, of somnambulism, and in the conditions of mediums. In this way Du Prel explains the wonderful feats of somnambulists, and the aerial journeys of sorcerers and witches. Whereas, ordinarily the separation of the material body from the astral body is only effected at the moment of death; in the case of somnambulists this separation may take place at any time, or, as Du Prel says: "the threshold of feeling may be permanently displaced."

In view of the natural relations of such theories to the dogmas of Christianity it is explainable that theologians also have raised their voices for or against spiritualism. While the *Protestant Church Times* beheld in the "repulsive thaumaturgic performances which these coryphæi of modern science offer, a lack of comprehension of real philosophy," the magazine *The Proof of Faith*, expresses its delight at the discovery of spiritualism in the following manner: "Every Christian will surely rejoice at the deep and perhaps mortal wound which these new discoveries have in all probability administered to modern materialism."

We shall pass by the childish opinion that the Bible also speaks of four dimensions, as both in Job (xi, 8–9) and in the Epistle to the Ephesians (iii, 18) only breadth, length, depth, and height, that is, four directions of extension, are mentioned. Yet we will still add, as Cranz has done, the reflections which Zöllner, as the most prominent representative of modern spiritualism, has put forward respecting its relation to the doctrines of Christianity (*Wissensch. Abhandl.*, Vol. III). By the foundation of transcendental physics on the basis of spiritualistic phenomena, the "new light" has arisen which is spoken of in the New Testament. The rending of the veil of the Temple on the crucifixion of Christ, the resurrection, the ascension, the transfiguration, the speaking with many tongues on the giving out of the Holy Ghost, all these are in Zöllner's view spiritualistic

phenomena. Similarly, he sees a reference to the four-dimensional world of spirits in all those sayings of Christ in which the latter speaks to his Apostles of the impossibility of their having any image or notion of the place to which when he disappeared he would go and whence he would return. (Gospel of St. John, xiii, 33, 36; xiv, 2, 3, 28; xvi, 5, 13).

Ulrici, however, goes furthest in the mingling of spiritualistic and Christian beliefs; for he sees in the doctrine of spiritualism a means of strengthening belief in a supreme moral world-order and in the immortality of the soul. In answer to Ulrici's tract "Spiritualism So-called, a Question of Science" (1889) Wundt wrote an annihilating reply bearing the title "Spiritualism, a Question of Science So-called." Wundt criticises the future condition of our souls according to spiritualistic hypotheses in the following sarcastic yet pertinent words, which Cranz also quotes: "(1) Physically, the "souls of the dead come into the thraldom of certain living beings "who are called mediums. These mediums are, for the present, at "least, a not widely diffused class and they appear to be almost ex- "clusively Americans. At the command of these mediums, departed "souls perform mechanical feats which possess throughout the char- "acter of absolute aimlessness. They rap, they lift tables and chairs, "they move beds, they play on the harmonica, and do other similar "things. (2) Intellectually, the souls of the dead enter a condition "which, if we are to judge from the productions which they deposit "on the slates of the mediums, must be termed a very lamentable "one. These slate-writings belong throughout in the category of "imbecility; they are totally bereft of any contents. (3) The most "favored, apparently, is the moral condition of the soul. According "to the testimony which we have, its character cannot be said to be "anything else than that of utter harmlessness. From brutal per- "formances, such, for instance, as the destruction of bed-canopies, "the spirits most politely refrain." Wundt then laments the demoralising effect which spiritualism exercises on people who have hitherto devoted their powers to some serious pursuit or even to the service of science. In fact it is a presumptuous and flagrant procedure to forsake the path of exact research, which slow as it is,

yet always leads to a sure extension of knowledge, in the hope that some aimless, foolhardy venture into the realm of uncertainty will carry us further than the path of slow toil, and that we can ever thus easily lift the veil which hides from man the problems of the world that are yet unsolved.

* * *

Now that we have presented the opinions of others respecting the existence of a four-dimensional world of spirits, the author would like to develop one or two ideas of his own on the subject. In the preceding section it was stated that everything that we perceive by our senses is three-dimensional and that everything that possesses four or more dimensions can only be regarded as abstractions or fictions which our reason forms in its constant efforts after an extension and generalisation of knowledge. To speak of a two-dimensional matter is as self-contradictory as the notion of four-dimensional matter. But a two or a four-dimensional world might exist in some other manner than a material manner, and for all we know in one which to us does not admit of representation. But in such a case, if it were without the power of affecting the material world, we should never be able to acquire any knowledge concerning its existence, and it would be totally indifferent to the people of the three-dimensional world, whether such a world existed or not. Just as an artist during his lifetime produces a number of different works of art, so also the Creator might have created a number of different-dimensioned worlds which in no wise interfere with one another. In such a case, any one world would not be able to know anything of any other, and we must consequently regard the question whether a four-dimensional world exists which is incapable of affecting ours, as insoluble. We have only to examine, therefore, the question whether the phenomenal world perhaps is a single individual in a great layer of worlds of which every successive one has one more dimension than the preceding and which are so connected with one another that each successive world contains and includes the preceding world, and, therefore, can produce effects in it. For our reason, which draws its inferences from the phenomena of this world, tells us, that if outside the three-dimensional world there exists a

second four-dimensional world, containing ours, there is no reason why worlds of more or less dimensions should not, with the same right, also exist. But if now, as Zöllner and his adherents maintain, four-dimensional spirits exist which can act by the mere efforts of their own wills on our world, there is surely no reason why we three-dimensional beings should not also be able to produce effects on some two-dimensional animated world. Whether we have, generally, any such influence we do not know, but we certainly do know that we do not act purposely and consciously on a two-dimensional world. If, therefore, Zöllner were right, the plan of creation would possess the wonderful feature that four-dimensional beings are capable of arbitrarily affecting the three-dimensional world, but that three-dimensional beings have no right in their turn consciously to affect a two-dimensional world.

The supporters of Zöllner's hypothesis will perhaps reply to the objection just made, that the plan of creation might, after all, possibly possess this wonderful peculiarity, that we human beings perhaps, in some higher condition of culture, will be able to act consciously on two-dimensional worlds, and that at any rate it is simply an inference by analogy to conclude from the non-existence of a relation between three and two dimensions that the same relation is also wanting in the case of four and three dimensions. As a matter of fact, the objection above made is not intended to refute Zöllner's hypothesis, but only to stamp it as very improbable. But despite this improbability Zöllner would still be right if the phenomena of the material world actually made his hypothesis necessary. That, however, is by no means the case. Although most of the phenomena to which the spiritualists appeal are probably founded on sense-illusions, humbug, and self-deception, it cannot be denied that there possibly do exist phenomena which cannot be brought into harmony with the natural laws now known. There always have been mysterious phenomena, and there always will be. Yet, as we have often seen that the progress of science has again and again revealed as natural what former generations held to be supernatural, it is certainly wholly wrong to bring in for the explanation of phenomena which now seem mysterious an hypothesis like that of Zöllner's, by which

everything in the world can be explained. If we adopt a point of view which regards it as natural for spirits arbitrarily to interfere in the workings of the world, all scientific investigation will cease, for we could never more trust or rely upon any chemical or physical experiment, or any botanical or zoölogical culture. If the spirits are the authors of the phenomena that are mysterious to us, why should they also not have control of the phenomena which are not mysterious? The existence of mysterious phenomena justifies in no manner or form the assumption that spirits exist which produce them. Would it not be much simpler, if we *must* have supernatural influences, to adopt the naïve religious point of view, according to which everything that happens is traceable to the direct, actual, and personal interference of a single being which we call God? Things which formerly stood beyond the sphere of our knowledge and were regarded as marvellous events, as a storm, for example, now stand in the most intimate connection with known natural laws. Things that formerly were mysterious are so no longer. If one hundred and fifty years ago some scientists were in the possession of our present knowledge of inductional electricity and had connected Paris and Berlin with a wire by whose aid one could clearly interpret in Berlin what another person had at that very moment said in Paris, people would have regarded this phenomenon as supernatural and assumed that the originator of this long-distance speaking was in league with spirits.

We recognise, thus, that the things which are termed supernatural depend to a great extent on the stage of culture which humanity has reached. Things which now appear to us mysterious, may, in a very few decades, be recognised as quite natural. This knowledge, however, is not to be obtained by the lazy assumption of bands of spirits as the authors of mysterious phenomena, but by performing what in physics and chemistry is called experiment. But the first and essential condition of all scientific experimenting is that the experimenter shall be absolutely master of the conditions under which the experiment is or is not to succeed. Now, this criterion of scientific experimenting is totally lacking in all spiritualistic experiments. We can never assign in their case the conditions un-

der which they will or will not succeed. When all the preparations in a spiritualistic séance have been properly made, but nothing takes place, the beautiful excuse is always forthcoming that the "spirits were not willing," that there were "too many incredulous persons present," and so forth. Fortunately, in physical experiments these pretexts are not necessary. By the path of experiment, and not by that of transcendental speculation, physics has thus made incredible progress and has piled new knowledge strata on strata upon the old. Accordingly, the prospect is left that the mysteries which the conditions and properties of the human soul still present can be solved more and more by the methods of scientific experiment. To this end, however, it is especially necessary that the physio-psychological experiments in question should only be performed by men who possess the critical eye of inquiry, who are free from the dangers of self-illusion, and who are competent to keep apart from their experiments all superstition and deception. The history of natural science clearly teaches that it is only by this road that man can arrive at certain and well-established knowledge. If, therefore, there really is behind such phenomena as mind-reading, telepathy, and similar psychical phenomena something besides humbug and self-illusion, what we have to do is to study privately and carefully by serious experiments the success or non-success of such phenomena, and not allow ourselves to be influenced by the public and dramatic performances of psychical artists, like Cumberland and his ilk.

The high eminence on which the knowledge and civilisation of humanity now stands was not reached by the thoughtless employment of fanciful ideas, nor by recourse to four-dimensional worlds, but by hard, serious labor and slow, unceasing research. Let all men of science, therefore, band themselves together and oppose a solid front to methods that explain everything that is now mysterious to us by the interference of independent spirits. For these methods, owing to the fact that they can explain everything, explain nothing, and thus oppose dangerous obstacles to the progress of real research, to which we owe the beautiful temple of modern knowledge.

HERMANN SCHUBERT.

CORRESPONDENCE.

I.

THE RELIGIOUS OUTLOOK IN FRANCE.

THE return of Mme. Hyacinthe Loyson to France after her American tour, undertaken, I understand, in order to obtain new support for the Gallican church, suggests the writing of this article, which will be a brief survey, from the point of view of an American layman, of the present religious situation in France.

As Père Hyacinthe's reform has been made the peg on which to hang this article, perhaps I cannot do better than begin by an examination of the noble but fruitless labors of the eloquent ex-Carmelite. While one cannot help being carried away by the oratory of Hyacinthe Loyson and charmed with his personality, so full of wit, kindliness, and gentility; while one must admire the devotedness and earnestness of Mme. Loyson and feel much sympathy for their studious and promising son Paul, one is convinced in spite of one's self that this latter-day Gallicanism is doomed to failure if indeed it has not already failed. You have simply to visit the poor little church in the Rue d'Arras, in this city, to see what a mere handful of followers Père Hyacinthe has been able to collect in this great centre of two million people, after years of work and after preaching hundreds of magnificent sermons that would fill to overflowing the largest edifice in America, Sunday after Sunday, if delivered with similar eloquence by a divine of no matter what denomination or of no denomination at all. To the practical layman of this practical age no further demonstration is necessary in order to prove that Père Hyacinthe's mission is, as the French say, *un coup*

dans l'eau, that is, an effort which produces no result. Whenever I leave this humble church and am well out in the narrow, shabby street in which it is situated and am away from the influence of the preacher's fascination, I cannot help exclaiming, What a waste of power, What a casting of pearls before swine! And all of Mme. Loyson's enthusiastic conversation in private, her accounts of the encouraging letters received by the Père, furtively of course, from discontented priests, and her statements concerning the warm words of sympathy and support from the churchmen of foreign lands, cannot remove that abiding feeling that this rejuvenated Gallican church movement is other than a dismal failure; more than ever one exclaims: *C'est un coup dans l'eau.*

Père Hyacinthe has always received, in France as abroad, his greatest support from the Protestants. But Protestantism here in France is a sickly growth when compared, for instance, with its rich and sturdy brother in the United States. It has, at most, only a small band of followers, nearly lost to view in the vast army of Catholicism and Freethought. Furthermore, the Liberal wing is losing ground and the Orthodox wing gaining slightly, not an encouraging sign in these days to those who hope for the final triumph of faith over the growing tendency towards infidelity. The real truth is that about the only strength left in French Protestantism to-day lies in the fact that there is a certain *éclat* associated, in the eyes of the upper classes, with the being a Protestant, much as is the case in America and England, in the same rank, about being a Roman Catholic. It distinguishes you from the multitude, and in these democratic times human nature, especially when it is that of the "upper ten," is very keen for elimination from "the vulgar throng." It is difficult for an American to comprehend this peculiar little streak of innocent vanity running through certain French circles which shows itself in this wish to be known as Protestants. It is not too much to say that to the impartial outside observer this phase of the French Protestantism of to-day is the one that first strikes the eye; which goes to prove in a peculiar but significant manner the weak hold, on the one hand, which the doctrine of Luther and Calvin now has on the French nation, and, on the other hand, how uni-

versal must be scepticism, freethought, and utter indifference to church and religion of every kind.

If native French Protestantism exerts so little influence on the nation, it is easy to imagine the excessive futility of the work of the foreign missionary. There is a great deal said in American and religious circles about the labors in France of the Salvation Army, the McAll Mission, the Young Men's Christian Association, etc. I have received more than one letter from would-be subscribers in the United States asking me if these and other similar organisations were really accomplishing all that they pretend. My reply is invariably that if you regard their labors as charity work some good is being done, but if money is asked for because of the religious results which have been accomplished, the demand should be considered to be arrant humbug. If Père Hyacinthe, a Frenchman and a Catholic, after forty years of labor, has accomplished next to nothing, it is easy to imagine how this nation, so reserved in its relations with the foreigner when he attempts to penetrate into its inner life, would treat Scotch and Yankee missionaries. From a religious standpoint, therefore, American money and sympathy is absolutely thrown away when it is sent to France. If it be answered that much misery and physical suffering is relieved by these foreign missions, the French might well ask if charity does not begin at home. The French are a peculiarly thrifty people. Few are poor, beggars are scarce and charitable institutions are rich and numerous. Hence devoting American dollars to the relief of French distress is much like sending coals to Newcastle, if it is not a piece of sheer impertinence, like our protesting to the Czar against his Siberian convict system when we have one quite as cruel in full swing in some of our Southern states.

And now, finally, a few paragraphs about the great Roman Catholic church of France, the only religious institution of any real first-rate importance in this country.

While it is true that the Catholic Church, at least as a church, still has a strong hold on the French nation, it is also quite true that indifference, infidelity, free thought, and atheism are on the increase. Matthew Arnold says, in his essay on Tolstoi, written in

1887: "Between the age of twenty and that of thirty-five he [Tolstoi] had lost, he tells us, the Christian belief in which he had been brought up, a loss of which examples nowadays abound certainly everywhere, but which in Russia, as in France, is among all young men of the upper and cultivated classes more a matter of course, perhaps, more universal, more avowed, than it is with us." Arnold might have enlarged, at least in the case of France, his limits and stated that in the cities the middle and lower classes, too, particularly the male portion, have abandoned Rome. One has only to visit a Paris church to be convinced of the contempt which men feel for the priesthood and religion: you can count ten female devotees for one of the masculine gender. In the village church, far away from the great centres, the priest may still have the large majority of the population, men and women alike, as faithful attendants upon service. But even here, for one man who confesses, a dozen or score of women will kneel at the chair. Then again, this more general participation in religious ceremonies by the rural population is due in a large measure to the fact that these Sunday masses and vespers are almost the only break and variety in a very dead and monotonous existence. The church is a sort of meeting place, where whole families, babies, children, and adults, congregate. The hum of idle conversation, the crying of infants, and the ardent exhortations of the priest are often mingled in a manner that would astonish and shock a pious Protestant, accustomed to the highly proper atmosphere of an Episcopalian or Presbyterian Church in the United States.

Another sign of the disfavor in which French Catholicism finds itself to-day is seen in the quality of its future priests. You have simply to look into the faces of the seminarists as they pass by you in procession in the streets of Paris to be convinced of the well-known fact that these young men are, for the most part, the faint-hearted and dull-headed sons of the peasantry, eager to escape the drudgery of farm life and not intelligent enough for business or the petty employments offered by the State.

"Anybody can make a priest," is often heard in France. The result is that just as the English army is the receptacle for the riff-

raff—the Tommy Atkinses of Rudyard Kipling's "Barrack-room Ballads"—of the cities, so the French priesthood draws most of its recruits from the scum of the farming districts. This fact contrasts strongly, by the way, with the manner in which the Protestants fill their pulpits. The young man who becomes a pastor is not looked upon by his friends and companions as a failure and a numskull. Quite the contrary; he is immediately classed among those taking a high moral stand. Some of the best families of France are descended from, or have relatives who are, clergymen, and they are quite proud of the fact; another example of that sentiment of halo surrounding French Protestantism to which reference has already been made.

Another cause of this boycotting of the cloth as a profession by the youth of the élite is due to the Church having got on the wrong side during the struggle for the foundation of the present Republic. The Catholics supported the Monarchists and Bonapartists and took an active part in the attempt to prevent the advent of republican institutions and to overthrow these institutions when they had been accepted by a majority of the nation. This unpatriotic course brought the Church into bad odor among republicans, so that the having a son in orders, for example, would be apt to be an impediment to a father aspiring to political preferment, especially if the latter belonged to the Radical or Socialist wing of the Republican army. The result is that a whole great political party is, in its general tendency, opposed to the Catholic Church.

Nor is the harm occasioned thereby limited to lowering the quality of the seminarists. It makes a vast number of intelligent and influential citizens sworn enemies of religion. Thus, when Gambetta attended funerals, he would not enter the church, but wait outside in the porch. When Louis Blanc was buried neither church nor priest participated in the pageant. On the death of Henri Martin, a free-thinking Protestant clergyman officiated at the burial service. Hundreds of other prominent Republicans, who have died or been buried since 1870, never entered a church, perhaps, except when their bodies were borne there by their families,

acting under the influence of its female members, or out of respect for public sentiment.

One of the shrewdest acts of Leo XIII. is his recent declaration in favor of the French Republic. He not only accepts the situation, but has ordered the faithful, both ecclesiastical and lay, in France to do likewise. But this demand has not been complied with without a murmur. More than one priest and noble has shown himself more ultramontane than the Pope. The important fact remains true, however, that officially the Vatican recognises the political change in France, and, though the Republicans, particularly those of the Radical camp, are wary of these new converts and still believe with Gambetta, that "*le clericalisme, voilà l'ennemi*," yet the mere fact that the Vatican lays down its arms means a great deal, even if the hatchet may not be definitively buried. Moderate Republicans, those who go to church even if they do not believe what is said there, think they see in this action of the Holy Father a new source of strength for the Republic. And it seems to me that they are right, and that this view is the soundest. If the priesthood ceases its attacks on the political powers that be, and if these latter keep a sharp watch, which will be done while the Radical and Socialist elements are so strong in Chamber and Senate, the clerical party can be held in check, and the Republic will have so many less enemies, even if these quondam enemies are but lukewarm friends.

THEODORE STANTON.

II.

NEW FRENCH BOOKS.

I am happy to have the opportunity in my present letter to speak of a book of real importance, *La pathologie des emotions, Études physiologiques et cliniques*, by M. Ch. Féré. The name of this learned physician of the Bicêtre is sufficiently well known to dispense me from the necessity of speaking of his personality, so that I can devote all that I have to say to his work. Its great merit is not so much the novelty of the psychological theory which is laid at its foundation, as the wealth of facts presented and the sureness of the methods pursued. M. Féré's mind is of a distinctly positive cast, and he possesses in a high degree the ability to draw from the thesis which he illustrates and confirms, the various consequences which from a medical and social point of view this thesis involves.

States of intellectual consciousness, he writes, citing Spencer, cannot be dissociated from emotional states. The emotions are the products of our mental representations of agreeable states or painful states, and are the stronger according as they contain a greater number of present or nascent sensations competent to recall these states. The emotions, accordingly, being simply representations of states of consciousness provoked by external excitations, it is to be presumed that the physiological conditions of emotions (of central or cerebral origin) present a striking analogy, if not an absolute resemblance, to the physiological conditions of sensations (of peripheral origin, either internal or external); and this relation should be as prominently marked in pathological as in normal states. The upshot of all this is, continues M. Féré, that physical agents capable of modifying a state of consciousness of peripheral origin (sensations), are also capable of modifying states of consciousness of central origin (emotions). "The external signs of these different states of consciousness can be studied by the same methods. Psychology is only specialised physiology; mental medicine only a specialisation of general medicine, from which it must borrow its methods of re-

search and action—all purely physical. The demonstration of these relations is the object of the present work."

The work, which contains almost six hundred pages, presents no divisions but that of chapters. But it would not be difficult to group its contents under the four general titles: (1) physiological and pathological effects of physical agents on man; (2) physiological conditions and pathological and curative effects of emotions; (3) psychopathy and morbid emotivity; (4) the consequences to individuals and society of morbid emotivity, its medical treatment, prophylaxis and legislation. The entire demonstration of M. Féré, I might add, is essentially aimed at the two following propositions: the first, that all the symptoms of emotions possess a certain resemblance to those of fatigue or physical pain; the other, that the original source of morbid emotivities and their resultant disorders is a state of depression congenital or acquired.

M. Féré reverts constantly to these fundamental ideas. After having exhibited, for example, the reciprocal influences of the emotions, or disorders of the imagination, and of disorders which are of physical origin, he concludes that "physical disease and moral disease have the same basis." It is thus only in appearance, he writes, that the mind has any influence on the functions of the body; the phenomena of mind are, quite the reverse, the necessary effect of certain modifications of the body, and it is by the intermediary action of the manifestations of the body that the representations of the mind act. It is found convenient to regard the gray matter of the brain as the central organ of the emotions, and the great sympathetic as the peripheral organ that presides over their "exteriorisation"; but we have no right to think of the emotions without their external signs, and we are thus led to the conclusion that "emotion is essentially a generalised reflex phenomenon the centrifugal path of which is principally the great sympathetic system."

A psychological question much debated since M. Ribot took it up, the question of *attention*, is also treated here, in an incidental yet very interesting manner (Chapter III). M. Féré connects attention with the study of the physiological conditions of physical action, and thus takes sides, it will be seen, with the motory theory

of attention. James Sully, and others, have denied the existence of muscular phenomena accompanying attention. But physiology is in a position to disclose the existence of these movements; it can study their qualities, their energy, their form, their precision, and their rapidity. We will find in M. Féré's book a number of new experimental facts establishing the thesis that "muscular tension constitutes the physiological condition of attention." "The mistake of many psychologists (M. Hirth, for example) has been, that they have confounded rest with willed immobility, which from a mechanical point of view is very far removed from the former; for immobility of will is precisely the result of very intense muscular activities, and can only be produced by a general tension of the muscular system, which throws the subject in a state such that it can react the most quickly and most energetically on any excitation, whencesoever it may proceed." Willed, or voluntary, immobility is attention itself; to produce this state, well-enervated and well-nourished muscles are necessary. "We may say," declares M. Féré, "that the practice of immobility is the most favorable exercise for the development of the mind: a system of education which should neglect this exercise would suppress attention, it would be a regressive education."

"It is lack of attention," he tells us further on, "that is the cause of the insensibility of hysterical patients, and it is instability of attention that is the cause of the variability of their sensory and motory disorders." It is all due to the want of sufficient energy to bring simultaneously into a state of tension the muscular settings of all of the sensory organs. Hysterical anæsthesia according to him —and how perfectly right he is!—is nothing but a mental and psychical disease, which may be cured by *suggestion*; it is an organic malady, which cannot be cured without the restoration of the proper organic state.

Worthy of notice are a few pages on the existence of electrical phenomena, "which are exaggerated in certain subjects, but which appear to exist in a more feeble degree in the normal states." The facts here involved might furnish us with a key to the phenomena of transmission, polarisation, elective sensibility, and certain actions

at a distance, whose solution still presents great difficulties. Also to be noted are a number of corrections of inductions made by Darwin, whom ignorance of physiology often involved in mistakes concerning the true nature of phenomena: thus Darwin was often led to attribute an intentional character to actions which are throughout reflex.

Basing his views on the inevitable correlation of these two orders of phenomena, the physical and the psychical, M. Féré stands in a position of direct hostility to the metaphysics (of course, unconscious) of the great body of alienists. He selects the characteristic disorder of insanity, namely hallucination, and sets about to show the existence of physical phenomena concomitant with hallucination. Chapter XIII is one of the most instructive of his work and well worth thoughtful perusal. Let us add on this point that M. Féré stoutly combats the doctrine, held by Magnan in particular, that all forms of phobia, that is to say, of morbid emotive states, are the brands of degeneration. He admits, however, that a great number are connected with permanent constitutional states, congenital or acquired.

M. Féré accepts the pathological and degenerative theory of crime. But he rejects in a measure Lombroso's thesis of the assimilation of genius to insanity. Genius and talent, he says, are by no means devoid of intellectual and emotional anomalies, but it is not true that neuropathic states are the indispensable concomitants of genius, although susceptibility to impressions is, when not developed to excess, one of the physiological conditions of genius.

With respect to the social consequences involved, I will simply quote his concise statement that "physiology is quite in accord with political economy in condemning the intemperate generosity which favors the development and multiplication of emotive personalities." With regard, finally, to the question of responsibility, M. Féré's position differs, so far as I can see, in no respect from my own, which I have expounded at sufficient length in a former number of *The Monist*, to dispense me from the necessity of reverting to it here.

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Our next book is also a remarkable one—*Les transformations du droit*, by M. G. TARDE, a small volume of some two hundred and

twelve pages. M. Tarde has again and again declared himself the avowed adversary of Spencerianism, and of evolution generally, at least in so far as the idea of evolution is indiscriminately and unreflectingly employed, as is the case, he maintains, in a great class of social questions which make up the criminal and civil law. Everywhere in these domains, despite apparent uniformity, which is the simple effect of a perspective that effaces the differences of remote times, is found diversity. The serial stages of development professedly disclosed, he rejects as absolutely incompetent in the explanation of criminal law, procedure, the status of persons and things, and obligations.

In criminal law, for example, we ordinarily regard the system of pecuniary composition as the origin of penal justice, and the idea of vengeance as necessarily antecedent to the idea of culpability. A mistake, says M. Tarde. And he offers on this subject a distinction which is quite curious. He sees the defensive reaction made against criminal acts originally splitting up into two distinct forms of quite unequal scope: the one moral, the joint product of indignation and compassion; the other vindictive, malevolent, and ruthless. The first, according to him, is exercised within the family and between members of the same social group; the second is displayed towards the foreigner and the enemy. Of these two sources of penality, the domestic moral punishment is the most important; the blow-for-blow policy, or vengeance, although more apparent, is a secondary source. I fully admit that the instinct of sympathy, the primitive condition of all social aggregation, has never been wholly absent from human relations, and it might be that the distinction perceived by M. Tarde is well founded, although the two sources appear to have become so confounded in the justice of the tribunals that it is difficult to trace them to that point. But M. Tarde seems to me to be too much disposed to flatter the portrait of the primitive man and to make as "mild as lambs" these prehistoric creatures whom we have pictured as "cruel as tigers," and to be too much preoccupied with the ideas of penality and moral responsibility, which he thinks the new theories have compromised.

With respect to the status of persons, he denies the existence of

the well-known order of development by which promiscuity, matriarchy, and patriarchy are said to succeed each other. The tribe could only have arisen, he tells us, from the federation of families, and the strong family, the one capable of development, could only have been patriarchal. It is wrong, he adds, to regard uterine filiation, that is, the custom of considering a child the son of its mother and not the son of its father, as a vestige of a pre-existent matriarchy. "In a patriarchal society, polygamy—which is the very reverse of matriarchy—ought in the very necessity of things to give predominance to the custom referred to, so that children born of the same mother could be distinguished from one another." This, indeed, was the idea of the Greek tragedians. The maxim, which occurs so often in Euripides, that it is not good that a man should have several wives, is always disclosed as the anxiety of assuring the legitimacy of children; Æschylus charges Minerva to defend the "cause of her father"; it is one of the aspects of the reaction against the customs of Asia. The primitive family, says M. Tarde, in summing up, was quite different in its original forms; it was here monogamic, there polygamic, and in other places polyandrous, at one time exogamic and at another endogamic, and so forth. "Marriage, therefore, did not spring from a single typical form, nor does it, in its various forms, make towards such."

His criticisms are of equal strength with regard to the status of things and the presumed priority of collective property. Contrary to the views of M. de Laveleye, he is of opinion that the community of the village could only have arisen on an enlarged model of the community of the family, "just as the vestal fire of the city could only have been lighted in imitation of the fire of the domestic hearth": The certain effect of the first must in its origin have been to encroach upon, not to produce, the second. Excessively preoccupied in finding in the present the vestiges of a state of things that is past, the evolutionists involve themselves, regardless of consequences, in many naïve and wonderful theories, which M. Tarde, in his keen and pointed style, has not hesitated to expose. There is much point and a profusion of the *granum salis* in these instructive pages.

With respect to obligations, he makes a distinction, as in crim-

inal law, between internal and external relations. Also, after having asserted with Sir Henry Sumner Maine, the non-fusion of the law of nature and the law of nations, he remarks that here also there exists two sources whose waters have not subsequently flowed together: the *jus naturæ* is conceived to be the generalisation of a type of relations abstracted from the internal relations of the members of the primitive social group; the *jus gentium* to be the outcome of relations between men that belong to different groups.

Is, then, this disordered succession of the social data mere chance? The reader will bethink himself of a number of facts which go to disprove this conclusion, and it is a difficulty moreover which M. Tarde has also felt. He replies by making a distinction of "two kinds of laws, the laws of causation and the supposed laws of evolution." The first, which in his theory are analogous to the laws of celestial mechanics, whose formulæ remain constant no matter what the history of the solar systems distributed throughout the heavens may be, are the psychological laws; the second are merely arbitrary formulæ, which, when we come to define them accurately, do not admit of adaptation even to the majority of cases. The psychological laws of which M. Tarde here speaks are reducible to *imitation** —consequently to *invention*—and to *logic*. I certainly do not propose to question the importance of these factors. In a short tract published several years ago I pointed out myself that the influences of contact are more efficient than the influences of race or even of climate, and this implicitly involves the idea of imitation. Yet the character of the psychological factor does not, it seems to me, exclude a tendency towards a certain arrangement of the data of society, despite their possible and actual diversity. "With respect to the facts of society," I wrote, "we point out their changes but do not succeed in disclosing the laws of their evolution; the most we have done is to note amid the totality certain features which appear to predominate." To extricate these features is a task not unworthy of the historian. M. Tarde himself admits that results of this character have already been reached, and he especially points

* See his work *Les lois de l'imitation* (Alcan, Paris).

to "the splendid and commendable movement in advance, which though not generally noticed* has, nevertheless, accompanied all juridical evolutions"—namely, the constant enlargement of the relations of law as the result of a growing sympathy and sociability.

To sum up, the point of view which M. Tarde has taken does not exclude a class of researches different from his. Nothing can be better than to formulate the laws of the psychological agent, and M. Tarde, original mind that he is, has done this with a superiority and penetration to which I yield my unqualified admiration. At bottom, does not the view of Auguste Comte, despite his contempt for psychology, involve the preliminary study of the biological individual and the social agent? Psychological laws and physical laws undoubtedly meet in the same group of "laws of causation"; still, it should not be forgotten that in the social order of things man is the creator of the facts and that his creations react upon him in the proportion in which they are realised. At any rate, a tangible relation exists between the creations of the agent and the variations of the results, and it is not forbidden to inquire if there does not also exist a certain order in these creations, the effect of which would be to produce a recognisable serial succession in the results, a medial line about which the events of our life oscillate. A difficult investigation—and one in which M. Tarde has shown himself to be too speedily satisfied, and in which we should strenuously guard against hasty generalisations. It is unpleasant, we admit, to turn topsy-turvy a house in which we have long lived in comfort; but our contentment returns in an increased measure when we have replaced our things in their proper places, and swept out the dusty corners.

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M. M. AGUILÉRA has just published a work entitled, *L'idée du Droit en Allemagne*. His book is a history of the different schools

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* I have called attention to this in a less definite manner in several passages of my book *La morale dans le drame, l'épopée et le roman*, in which I shall have to incorporate the corrections which the splendid studies of M. Tarde have suggested. For the citation given a few lines above I ask permission to refer the reader to my *Journal d'un philosophe* (Alcan, Paris).

of law which have arisen in Germany and lays especial emphasis on the fact that no nation has advanced as far as this in seeking in philosophical ideas the motives and the justification of its acts, and he sets about showing how the existence of Germany's special conception of law may be explained. Germany, he writes in his conclusion, everywhere starts from the idea of force. Its peculiar characteristic is to bow before victorious force. And to this must be added, if we wish to comprehend its aggressive character, the sentiment of vanity, which has led it to proclaim "that incredible formula: the ideal of Germany is the ideal of humanity."

M. GEORGE LYON gives us a learned historical study, *La philosophie de Hobbes*. He points out how everything is interrelated in the work of this philosopher—his conception of the state to his theories of ethics, his ethical doctrines to his psychological theories, and the latter to general principles concerning nature, thought, and their laws. But he also presents with much force the objections to Hobbism. He condems its final consequence, which is submission to force. He points out finally the inevitable ambiguity which permeates this system in consequence of the struggle "between individual inspiration, which is purely ontological, and the action of an intellectual environment which is eminently empirical. Hobbes was "the metaphysician of empiricism as Bacon was its poet." I dismiss for the present all discussion of these subjects; an occasion will present itself later of dealing with them.

In *Les races et les langues* M. ANDRÉ LEFÈVRE sums up the state of the science of language. The distinguishing characteristic of his work is the non-separation of language from the organism which has produced it, and the simultaneous presentation of languages with the ethnical groups which speak them. M. Lefèvre accepts, let us note at once, the well-known stages of the linguistic school—monosyllabism, agglutination, inflection, and analysis, which M. Tarde, if he should unexpectedly become a philologist would stigmatise as gratuitous. Of the races, of the places of origin, and of the migrations of the ancient peoples he tells a great many stories which are somewhat of the fairy-tale order, but this reservation does not affect in the least the value of his special linguistic researches.

In conclusion I shall mention *Le problème de la mort, ses solutions imaginaires et la science positive*, by M. L. BOURDEAU, and *Platon, sa philosophie, précédé d'un aperçu de sa vie et de ses écrits*, by M. CH. BÉNARD, a new volume in the series of historical studies by this venerable professor.*

LUCIEN ARRÉAT.

* All the works mentioned are published by F. Alcan.

BOOK REVIEWS.

EINLEITUNG IN DIE PHILOSOPHIE. By *Prof. Friedrich Paulsen.* Berlin: Wilhelm Hertz. 1892.

Friedrich Paulsen, professor at the University of Berlin, writes this "Introduction" not so much for connoisseurs as for students, whom it may serve as a guide. He discusses in general outlines the various fundamental problems of philosophy, at the same time indicating his own position, which, in more than one respect, is very similar to the philosophy presented in the columns of *The Monist.*

His own view, which, as he trusts, is the general tendency of modern philosophical thought, he calls "idealistic monism." It is opposed, on the one hand, to supernatural dualism, and on the other hand to atomistic materialism; the former being the traditional doctrine of the schoolmen and of ecclesiasticism, separating body and soul, nature and God, etc., each into two distinct realities, which are accidentally combined, the latter being an attempt, having its beginning in the eighteenth century, to explain all natural phenomena in a purely mechanical way. Paulsen adds: "The whole history of modern philosophy can be said to be a con-"tinuous attempt to overcome this opposition. . . . The principle of natural science "is the *Natur-Gesetzmässigkeit* of all events. . . . Modern materialism derives from "this a kind of metaphysics, represents all reality as a system of blindly operating "physical forces. . . . Philosophy undertakes to dispel the opposition of these two "doctrines; its proposition is—and we may say that this is the main-spring of the "entire evolution of modern philosophy—*to reconcile the religious world-conception "with that of natural science.* There are many who regard this aspiration as a sort "of squaring of the circle, and we grant that some similitude between the two may "exist, for here as well as there we can attain only to approximations, here as well "as there we can never solve the problem finally and forever. At any rate, we "must recognise the fact that the whole philosophical thought of the last three "centuries has been directed towards this goal."

Professor Paulsen classes the various philosophies of the present time as follows: (1) The phenomenalistic-positivistic philosophy which denies any absolute cognition of reality, least of all in physics; the world of objects is a world of phenomena. (2) The idealistic monistic philosophy. To define the nature of reality

as it is in itself, we must rely upon the data of our inner experience. The intellectual-historical world is to us the most comprehensible dénouement of reality—in fact, the only comprehensible one. The ultimate idea to which we are led in tracing out facts, is this: Reality, which presents itself to our senses in the objective world as a unitary system of motions, is the appearance of a spiritual all-being, which must be conceived as the evolution of some unitary idea. In this respect idealistic monism agrees upon the whole with speculative philosophy, or rather with all idealism since Plato.

The philosophy of the present time is, further on, characterised (3) as passing from intellectualism to voluntaryism; namely, it allows the will to have its legitimate influence in the construction of a world-view. It is (4) evolutionistic-theological, which latter tendency meets half way the above-mentioned idealistic monism. Both are beginning to permeate ethics, sociology, jurisprudence, and politics. The old formalistic methods are dropped and teleological considerations prevail. Purpose is recognised to rule in life. Lastly (5) the philosophy of to-day is historical. The older philosophy is mathematical-naturalistic or abstract-rationalistic. Speculative philosophy precedes the construction of an intellectual-historical world; it then attempts also to construct nature historically, at least in a logico-genetic schematism. Natural science has already pursued this course in its cosmical and biological theories of evolution. It is apparent how these tendencies follow the old tradition of harmonising the physical and the intellectual-historical worlds into one unitary conception of the whole.

The book is divided into two parts, with an introduction and conclusion. The introduction defines the relation of philosophy to mythology and to the sciences. Philosophy cannot be separated from the sciences. Says Paulsen: "Figuratively "speaking, reality is a great riddle proposed to man; all the various sciences de- "termine some parts of it, and the attempt to solve the *whole*, to find the key to "the *mysterium magnum* of being, is called philosophy."

The first book treats, in two chapters, of the problems of metaphysics, viz.: the ontological problem and the cosmo-theological problem. In the former chapter materialism, panpsychism, and the nature of the soul are discussed, while the second chapter is devoted to atomism and teleological theism, implying such subjects as the theory of evolution, causality, pantheism. The second part reviews, in the first chapter, the problems of the theory of cognition, viz.: the idealistic arguments, the realistic views, and our knowledge of the outer world. The second chapter presents an exposé of the problems regarding the origin of cognition as viewed by rationalism and empiricism, paying special attention to Kant's formalistic realism. The conclusion is a brief treatment of some ethical problems.

It is impossible to discuss all the details of the 444 pages of Paulsen's book, but a few specimen quotations from the chapter "Pantheism and World-soul" may be welcome to our readers. Our author asks: Considering all the tendencies of yearning and willing that appear in the innumerable forms of reality, is there a unity of

inner life corresponding to the unity of the physical world in its universal interaction? The affirmation of this question constitutes the idealistic pantheism.

Idealistic pantheism is to Professor Paulsen the simplest and most obvious construction of the world possible. To other world-views, the existence of the soul is a problem; it has even been called an "absolute problem." "I believe," he adds, with great truth, "that there can be no stronger argument against any world-"view than that it regards the existence of soul as something absolutely mysteri-"ous." There is a power of conviction in idealistic pantheism verified by the astonishing agreement of the testimonies of many various thinkers in the Orient as well as in the Occident, in antiquity no less than in modern times. (P. 243.)

Says Professor Paulsen: "The dayfly may imagine when the sun sinks that "all is at an end; light vanishes forever and the whole world is swallowed up in "darkness and death. But man who sees so many suns sink and rise should have "learned that in the infinite there are many possibilities which he cannot see at "present [p. 241]. The conception of a world-soul, of a spiritual all-being, of a "*mundus intelligibilis* appears to our physicists and physiologists in the same light "as the conception of anthropomorphic deities—as a childish dream. They have no "need of this hypothesis [pp. 243–244]. Du Bois-Reymond declares that a natur-"alist before admitting the assumption of a world-soul should demand, 'that we "ought to find somewhere in the world neuroglia embedded in warm arterial blood "under the proper pressure and provided with appropriate sense-organs, ganglions, "and fibres, corresponding to the intellectual capacities of such a soul.' An ani-"mal," says Paulsen, "needs as a matter of course legs to stand upon and to move "with, a stomach, teeth, eyes, and a central nervous system, but the All is not in "need of this; it needs no legs to stand upon and to move with, no stomach for ali-'mentary purposes, no eyes, no ears, for there is nothing to be seen or heard out-"side of it, and so it can also dispense with a nervous system and a brain."

Quoting two passages, one from Fechner, the other from Nägeli, to the effect that the system of fixed stars might be regarded as a group of molecules in an infinitely larger whole which we should have to conceive of as a unitary organism, Paulsen says: "Indeed, there is no objection to regarding a planet as a ganglion of "the world-brain. Is it too large? No. Why should not the world-brain have "bigger cells than an animal brain. Or is its composition inappropriate? Why? "We find in it the same materials, carbon, oxygen, nitrogen, iron, phosphorus, and "so forth, and also innumerable interactions similar for all we know to those that "take place in a ganglion. Who knows how striking would be the resemblance of "their structures, if we could but see a ganglion under a sufficiently powerful mag-"nifying glass."

These ideas are mere possibilities and are presented as such, but we cannot attribute to them any philosophical, scientific, or religious importance. Our idea of "a world-soul" or, better, of God, is different and we avoid purposely anything that can be constructed upon the basis of a vague hypothesis.

We ourselves reject pantheism, the view which identifies God and the All for reasons which we need not repeat here. We call our view of God entheism, and in forming our idea of God we purposely avoid such fantastical assumptions as considering the possibility of solar systems being molecules in the organism of a huge world-animal. Granted the truth of this view, the mere possibility of which we cannot deny, this extraordinary creature or world-animal would not be God, its will would not be our moral authority; it would not be the eternal, the immutable, the ground of all being, the ultimate rule of action, and the omnipotent universal law of existence: it would merely be a creature like ourselves, only immeasurably bigger, evolving like other animals and subject to the same or analogous or perhaps similar wants, disappointments, sufferings, and joys as ourselves. What a miserable God such a world-being would be; we know nothing of him and he knows nothing of us. His will and aspirations would have even less influence upon our aspirations, than, for instance, the hopes of a man upon the molecular groupings in his tissues, we being only the parasites upon the crust of an atom of his tissues. We have presented our view of the subject in Vol. III, No. 2, pp. 249–257, of *The Monist*, in the third part of the article "Panpsychism and Panbiotism," with reference to a similar hypothesis incidentally touched upon as a possibility of monistic theism by Professor Romanes.

We simply state the difference between our position and that of Professor Paulsen concerning the nature of a world-soul without intending to make more of it than he does himself; for, if we are not mistaken, it is with him a mere suggestion.

We conclude our review with a passage which shows Professor Paulsen's attitude toward Christianity, which more than anything else proves the general agreement of his work with ours. He says:

"The Christian faith is not a philosophical system, not a theological dogma "and still less the residue of an old superstition, but the immediate and living cer- "tainty of the heart concerning the nature of the good and its importance in real "life. This faith can be to-day the same as it was in Luther's, or St. Augustine's, "or the apostles' time who saw Jesus with their own eyes bodily. If Christianity, "did indeed consist of a number of doctrines and opinions, it would certainly be "true, as some claim, that it has been dead a long time, for doctrines and opinions "are not long-lived. If Christianity really did consist of the belief in the creation "of the world five thousand years ago out of nothing, the rib story of Eve, the story "of Eden and the fall, etc., etc., ... then indeed it would be impossible for a "thinking man of to-day to be a Christian. But all that is not the faith of Chris- "tianity, it is not the religion of Jesus. And if all the leaders of all the confessions "declare that this is the Christian faith and that he who does not believe all these "things can have no part in Christ, their proposition must be rejected as untrue. "No one can be saved by believing these things; while the request of the church "to believe in certain opinions set forth by men has expelled many an honest man. ". . . . In the life and death of Jesus I have learned to understand the meaning of

"life and I call God and the revelation of God that which makes my life possible "and explains to me the significance of my life. . . . Is such a faith compatible "with the above-mentioned monistic world-conception? My answer is, By all "means."

This is Professor Paulsen's solution of the problem of a reconciliation of science and religion—and we add that it is ours too. P. C

FIRST STEPS IN PHILOSOPHY. By *William Mackintire Salter*. Chicago: C. H. Kerr & Co. 1892. Price, $1.00. Pages, 155.

This little book is divided into two parts: (1) Physical, (2) Ethical. In the first, Mr. Salter discusses the conception of matter; in the second, that of duty. Mr. Salter's philosophical position is epitomised in a sentence which he quotes from Herbert Spencer. This sentence states, that, "what we are conscious of as proper-"ties of matter, even down to its weight and resistance, are but subjective affections "produced by objective agencies which are unknown and unknowable." Mr. Salter's philosophical position, accordingly, is, first, Idealism, and, second, Agnosticism.

In ethics, Mr. Salter's view embraces Utilitarianism, or Hedonism, and Intuitionism, both of which, he says, are incomplete in themselves, and must be supplemented by other elements Utilitarianism makes happiness the ultimate end; Intuitionism, virtue; and Mr. Salter adds, such an end must embrace the "realisa-"tion of *all* our capacities." Mr. Salter's ethical position has been before discussed in our journals.

If we study Mr. Salter's philosophical views, we shall find that his theory is a reproduction of Berkeley's analysis of the data of knowledge, embellished by the results of modern physiological psychology. Yet Mr. Salter's theory, although it everywhere shows the traces of a close study of Berkeley's views, presents the strange historical anomaly of undoing Berkeley's work. Berkeley's undoubted aim was to place knowledge on a basis of fact and refute, in a philosophical manner, the agnosticism, metaphysicism, and transcendentalism prevalent in his day. But Mr. Salter adds to Berkeley's results the very things that Berkeley sought to overthrow, and thus renders the latter's analysis (and consequently his own) in need of an equivalent analysis.

Take, for instance, the above-quoted sentence from Herbert Spencer, to which Mr. Salter assents. "Objective agencies," "unknown and unknowable"! Is this consistent? All knowledge is a knowledge of sensations, a knowledge *of* and *in* the mind, says the idealist, and we cannot, by any process of ratiocination, arrive at things "outside" the mind. Yet he himself, it seems, arrives at a knowledge of "objective agencies" outside the mind (pp. 65, 69), and, what is more wonderful, at agencies that are "unknown" and "unknowable." Surely, this is not abiding by an analysis of the facts of sensation (Berkeley). It is as unrational a procedure to infer metaphysical objective agencies, as it is to infer a metaphysical substratum "matter," which last is the error of the realist.

Again, take the notion of cause. Here, also, the same unwarrantable abandonment of the facts of sensation, i. e. of *all that is*, is evident.

At the end of an analysis, in which he shows that "all the choir of Heaven and the furniture of the earth," and "all which it inhabit," retreat and vanish in mind, Mr. Salter asks: "But is there absolutely nothing real and objective left? "So far as sensible phenomena are concerned, we must answer, No, absolutely "nothing is left; the whole sensible (material) world is but an effect upon ourselves. "But," he adds, "it would be a hasty inference," on these grounds, "to say that "nothing whatever is left." And when asked "what is left," he answers, "all "that causes sensation." We can never know scientifically what these causes are, but "we have an inextinguishable faith" *that* they are, "there being no particular "thing we are more sure of than that for every event (and every sensible phenome-"non is an event, viz., in ourselves) there is some kind of explanation or cause." To sum up: The theory of "sensible or physical idealism"* implies a "super-"sensible or metaphysical realism." In the theory of sensible idealism things only exist as sensations; "only exist, that is, *save in their supersensible or transcendental* "*causes*"—which, says the author, we must always add.

What is a cause? Cause is an abstraction. An abstraction from what? from a real, physical world, or from a metaphysical, transcendental world? Plainly, from our real world, from Mr. Salter's world of "sensible reality." By what philosophical warrant, then, is this concept applied to a world from which it has not been derived and to which it surely cannot apply! It is wrong to speak of a cause of the All. The All has no cause, just as it has no weight.

All these difficulties arise from the notion that there are two kinds of knowledge and two kinds of existences. Idealism, to be consistent, must be absolute; Mr. Salter's idealism is not absolute. This is exactly the criticism that the reading of his book at once forces on one. All knowledge is knowledge of sensations, i. e. of reality; things not accessible to sensation are not real, they do not exist; consequently, all entities transcendental, metaphysical, and supersensible do not exist This is the conclusion to which any philosophy, idealism, realism, or what not *must* lead.

Nowadays, few people dispute the fundamental thesis of idealism (of course, expressed in different terms from those of Mr. Spencer's sentence). In a sense, it is established. Its only drawback is, that its "establishment" accomplishes nothing. It leaves the problem of philosophy where it found it.† Reality is still reality. The same difficulties and perplexities exist. The universe still mocks us. And foremost among the riddles that the world opposes to man, stands that eternal

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* Mr. Salter's name for his theory.

† Says Mr. Salter: "Idealism (as here stated) is not, however, itself a solution, being only a clear statement of what the problem is; and for all that such idealism can say, the problem may be insoluble."

query: "What is mind?" Mr. Salter's views of this question will show us what contributions his theory is likely to make to philosophy.

Mr. Salter defines mind as "that which experiences sensations and thoughts, "or, more simply, that which feels and thinks." It is not feeling, not thinking, but *that which* feels and thinks. It is thus an agent, a subject. It is difficult to understand how this notion of mind is come at, without self-contradiction. In their origin, all notions of mind-subjects, mind-essences, mind-agencies, and so forth, are materialistic. They must be volatilised and stripped of their substantial attributes, if they are to take a place in an idealistic philosophy, and then, as they "cannot be "ranged along with the sensible phenomena of which the mind takes cognisance," there is but one realm left to exist in, which is the transcendentalistic.

All this comes from carrying the abstraction by which "mind" is reached, to mathematically infinite limits. In this abstraction the world retreats and fades away into nothingness. And what is left? Not a single idea or fact by which we can fix our abstraction. Mind is all, and mind is nothing. It is not matter, not time, not space—not even a mathematical point, which we expect it to become in its infinitely contracting perspective. It has no attributes, no qualities; it is nothing and nowhere. This conception of mind, Mr. Salter says, is only mysterious as we *make* it so, by careless and inaccurate thinking. And Mr. Salter is right. It would require much careless thinking to make such a conception mysterious. A thing or notion that cannot be defined, placed, or brought into connection with any other thing or notion in the world, is not *mysterious*, but simply does not exist. In that respect, it is as plain as day.

The same confusion exists in the discussion which disposes of the query, "*Where* is mind?" The idealist, in Mr. Salter's sense, does not admit that the mind is in, or in anywise spatially connected with, the brain. The question, *where* is mind? he says, has no meaning, any more than the question, what is the color of a pleasure? This is true. Mind is an abstraction. In this sense it has no spatial existence. But the phenomena from which this abstraction has produced itself, *are* linked with phenomena which have spatial existence, and in this sense the mental processes are not mysterious nothings and nowheres. When I lose that group of sensations called my leg, I know that, generally, I have lost the feeling of my leg. So, also, when a certain part of that group of sensations called my brain is destroyed, I know that I shall then have lost my power of memory or of speech or of motion. I may also experiment with other groups of sensations called dogs and cats, which I know have mental powers. In the light of these facts it is not correct, either in philosophy or common sense, to say that mental processes are absolutely independent of locality. I know that my thoughts are not connected with the group of sensations I call the moon, and I know they are not connected with that group of sensations that I call Mr. Smith. I am always aware of them as connected with that group of sensations which I call "myself."

Mr. Salter, in fact, half recognises this. He says, "The mind *is* dependent on

"the body in the sense that our general power of sensation and thought is connected "with those sensations we call our body." Yet, "why this should be so is myste- "rious." Indeed! One is inclined to ask Mr. Salter here, what species of explanation or knowledge he wishes of this phenomenon. Is explanation, or knowledge, something more than the recognition and seeing of a plain connection between the groups of sensations that constitute reality? In Mr. Salter's analysis, all the facts of the world are mysterious. Why a thing is as it is and is not other than it is, is mysterious. He utterly fails to understand why the power of perceiving colors is linked with the particular group of sensations he calls his eye, and why it should not just as well be linked with some other group or no group at all.

Why do I see with my eye? Why do I not see with my hand or with the hairs of my head, or why do I not eat with my elbow, instead of my mouth? Why do not stones fall upwards? Why do not magnets point towards the East? Why do not the planets move about Jupiter or Saturn? Mr. Salter's question makes a jumble of the whole universe.

It is not the object of science or philosophy to find out why things are not what they are, but to find out what they are. In this inquiry the why and wherefore, properly understood, will evolve themselves.

Science simply concerns itself with the connection of the groups of sensations which the idealist, and for that matter every one else, calls reality. It cannot concern itself with anything else. All other things are artificial and self-made existences. Nothing exists but reality and the connections of reality. To seek for any other connections than those that exist is absurd and futile. And to seek for any other causes or cause of relations than such as really are is also futile. Before we speak of the knowledge of a thing we must analyse and define our notion of knowledge, and before we speak of the cause of a thing we must analyse and define our notion of cause. In our view, the relation which Mr. Salter doubts, is so intimately and inextricably one, that the causal relation disappears. Neither is the cause of the other. We may, for the purposes of inquiry, start from either as our general concept, but we should never go so far as utterly to expel from reality the other. True science and philosophy are neither idealistic nor materialistic, but *real*. The two positions are extreme positions, and each is useful only as a safeguard against the errors of the others. Reality is reality; that is the main thing. Whether it is idealistic or materialistic is of minor consequence. Besides reality there is nothing; its negation is non-existence.

We do not wish in these criticisms to repudiate all that is in Mr. Salter's book. A great many of its reflections are helpful and suggestive. We may refer, for example, to the passages in which the body is regarded as a gradually decreasing wall of separation between that part of reality which is known subjectively and that part which is known objectively. This is really a unitary view. We believe, however, that if Mr. Salter would carefully analyse the notions of knowledge, explanation, cause, effect, and, therefore, the notion of reality, he would not push his philosophy

to the mysterious extreme at which it finally arrives, and he would absolutely reject such unscientific conceptions as supersensible realism, metaphysical realism, and supersensible or transcendental causes. These render the reading of his book as a philosophical help unsatisfactory, and leave the mind even more confused and perplexed than it was before. However, all discussions of this sort have their value, and Mr. Salter's book possesses a virtue which few other philosophical productions can boast of: it is very short. The author's pleasant style will also add to the pleasure of its perusal, and if read critically the book will evoke much helpful thought.

T. J. McCormack.

A Review of the Systems of Ethics Founded on the Theory of Evolution. By *C. M. Williams*. New York and London: Macmillan & Co. 1893.

This is a book, the perusal of which will leave the earnest student of moral science full of disappointment. Not at all that it manifests any lack of ability or information. On the contrary, it is at once clearly and entertainingly written, and at the same time packed with notes and comments that are full of interest and instruction.

The course of the book may be briefly stated. The first part, comprising nearly half of its six hundred pages, is devoted to the statement of the ethical doctrines maintained by thirteen prominent writers, whose views have been formed more or less under the influence of the theory of evolution, viz.: Darwin, Wallace, Haeckel, Spencer, Fiske, Rolph, Baratt, Stephen, Carneri, Höffding, Gizycki, Alexander, and Paul Ree. The rest of the book is the review of our author. This review is conducted under the topical heads: The Concepts of Evolution; Intelligence and End; The Will; Thought, Feeling, and Will in Evolution; Egoism and Altruism in Evolution; Conscience; Moral Progress in History; The Results of Ethical Inquiry on an Evolutional Basis; and The Ideal and the Way of Its Attainment.

These are all topics of great interest and importance, and the author has brought to the consideration of them a mind fully stored and entirely competent. But we look in vain for that discourse and criticism which above all other matters relating to moral science those who are interested in human welfare crave from those who tender their reflections upon ethical topics.

The great need of moral science is the discovery and certification of its basis. It is a need that far transcends the scope of mere moral science, for upon its right determination depends the right determination of a multitude of questions that deeply involve the welfare of humanity. It is a need that is not merely crying to be supplied. It is absolutely wailing. Could it only be rightly determined, mankind would fast enough orient itself in the course of evolution and with undissipated energy work out its best possible development. But undiscovered or uncertified it balks all process, save only that mechanical, halting, stumbling process that has hitherto obtained; a process that is, as all may observe, one that has little if any inward coördination, but is full of inability and cross-purposes. Since it was the

professed purpose of our author to review a number of the more prominent systems of ethics, which he esteems to be founded on the theory of evolution, his failure to notice and to comment upon so conspicuous a feature of moral science would naturally lead a reader, unversed in the works noticed, to suppose that those works had altogether slighted this topic. Such is, however, not the case. With the exception of perhaps Darwin and Wallace, all the writers reviewed by our author have given more or less attention to this matter, and they have left us in no doubt as to the positions which they severally hold. Most of them are Hedonists of one sort or another. Haeckel, Carneri, Rolph, and Alexander are, we believe, the only exceptions.

But a more serious criticism upon the work under notice is suggested by its very title. That title as much as says that the various works which are reviewed by our author are "founded" upon the theory of evolution, at least in so far as their ethical doctrines are concerned.

Now, what is the theory of evolution? What is its essential nature? Does not its very form consist in the affirmation of an eternal secular mutation, in which there is no discontinuity whatever? It says that existence in sum and in every detail is eternal and continuous process. It uncompromisingly forbids all suppositions of any absolute beginning, or of any absolute end, or of any absolutely final adjustment. Hence, no system of ethics can with truth be said to be "founded" upon the theory of evolution that ignores or forgets this essential character of it. Now, when we turn to the consideration of the various "systems" which our author supposes to be "founded" upon the theory of evolution, we find them, one and all, occupied more or less with suppositions of ends. All are forecasting some "ideal" condition, which, being attained, all chances of retrogression will be foreclosed and all possibilities of betterment will be exhausted. In other words, they suppose an attainment of death, or rather an attainment of a death-in-life more utterly horrible than any actual death can possibly be. The very first condition for an ethics that will be truly evolutional must be the fit and full recognition of a boundless horizon to evolution in morals as well as in all else. Emerson perceived the truth when he said in "The Sphynx":

> "Profounder, profounder
> Man's spirit must dive;
> To his aye rolling orb
> No goal will arrive.
> The heavens that now draw him
> With sweetness untold,
> Once found; for *new* heavens
> He spurneth the old."

And at present, the most serious efforts to establish a truly clear-sighted ethics of evolution, with an unequivocal disavowal of any and all Hedonism, is made by the editors of *The Monist*. It, indeed, is the key-note of the missionary work that characterises all the publications of The Open Court Publishing Co.

Any truly evolutional ethics must show itself a doctrine that applies just as well to regress as to progress. Evolution is too often confounded with progress, but degeneration is just as truly evolutional as is the contrary movement, and, looking the facts of existence in the face, mankind has no assurance of any unchangeable course of betterment. The principles of morals are, however, not dependent upon the benign action of nature. When the earth's stock of fuel shall become exhausted, or when the ice age returns, or when the sun grows cold, there will be no alteration thereby in the moral law. Good and evil must and will be the same under all circumstances, and no system of ethics is nor can be anything but a temporary makeshift, that does not as well fit the *diastoles* as it does the *systoles* of existence. We must look for a doctrine that shall inform the conduct of men not only for the fore part of the day, when all is jubilant and bounding and man asks only for some good task to do, but also for the evening and night, when man grows weary and craves for rest; for not only youth and maturity, but for waning strength, old age, and death; for not only the progressive era of cosmic history, but for the periods when natural conditions may disfavor mankind, when, say, man may gradually be so reduced in resources that the same will barely suffice for simple life-preservation; when under the stress of natural conditions the human intellect, in the course of generations, becomes step by step eliminated; when indeed humanity itself tends perhaps slowly, but with certainty, towards permanent extinction.

They who complacently protest that the theory of evolution leaves the domain of moral science substantially unaffected are surely in great default either in their comprehension of the nature and implications of that theory, or in their powers of circumspection, while those who suppose that moral science becomes evolutional simply because of a little application of that theory to some of the subordinate questions that are involved, show themselves in a plight as bad as the others if not worse.

Our author notices without dissent, and even with seeming concurrence, the various remarks made by many of the writers reviewed by him in discredit of teleology.

Since as we have before protested the theory of evolution forbids all suppositions of any ends that are absolutely final, it of course follows that teleology is in the strictness of its meaning inadmissible, even in ethics. But in dismissing teleology, let us not pour out the child with the bath. However it ought to be with the interpretation of the order of nature as a speculative exercise, something that is analogous to teleology is an absolute necessity if ethics is to be anything more than a curious study of human practise. The universe may manifest no purpose, design or secular tendency, but man is and can be nothing but a miserable estray on the ocean of existence unless he sails on a course, instead of merely drifting. To do this he must take something by which to steer, and any plausible stability is better than no bearings whatever. At any rate man is insuperably drawn to thus mark out his course. If the theory of evolution forbids him to suppose any ends that are ab-

solutely final, it does not prevent him from ascertaining directions. Indeed evolution affords him data of the very first importance for that behoof. Instead of ends we have aims and if ethics is to become that counsel and guide to humanity, which we yearn for so anxiously, it must ascertain and certify that single paramount aim to which all other tendencies are naturally subsidiary. Teleology, or rather the determination of the aim of evolution, must prepare the foundation before any evolutional ethics that is worthy the name can be established.

Again our author with considerable debate notices the remarks of the writers reviewed by him on the old question of free will and necessity,—but like the positing of some end or aim to be subserved, free will is one of the presuppositions of ethics. When man begins to debate the possibility of rightly ascertaining the true end or aim for his pursuit, or when he begins to moot the question of free will, he is debating not any question of ethics proper, but only whether such a science is possible. Unless conditions and events are functions, as well of man's personality as of his environment; unless persons count for something in the variations of the course of nature, it is altogether vain and idle to be troubled with questions of morality.

Free will and somewhat to be achieved are principles which whether well or ill founded, ethics proper must take for granted before it has or can have any *raison d'être*. As for free will, however the metaphysicians may have stumbled over their own feet, the common sense of mankind has never wavered. As a practical question (and ethics is pre-eminently a matter of practice) this question is not an open one.

But on the question of what is the true paramount aim for man to pursue, the decision that shall finally satisfy man is yet to be made. The best proof that no satisfactory answer has yet been made is the fact that we are still seeking an answer. As with regard to the needful prime condition for a truly evolutional ethics we found wisdom in the poetical insight, so again in this exigency we personally find the most profound ethical philosophy in that same insight.

> " 'Tis Life of which our nerves are scant.
> 'Tis Life, not death for which we pant,
> More Life, and fuller that we want."

FRANCIS C. RUSSELL.

DER PESSIMISMUS IM LICHTE EINER HÖHEREN WELTAUFFASSUNG. By *Dr. J. Friedländer* and *Dr. M. Berendt*. Berlin W.: S. Gerstmann. 1893.

The authors' aim is the refutation of pessimism and the foundation of a higher world-conception. This latter is a pantheism spiritualised by moral ideals and contrasted to Darwinism and materialism. Natural science is said to be the surrounding walls of the new view, furnishing (1) negative truths of criticism and (2) a knowledge of the positive features of nature. The negative truths are: the impossibility of the existence of a personal God, of the efficiency of prayer, of miracles, of the immortality of the soul, of the separate existence of souls without bodies.

The positive results of natural science are the unity of nature, the indestructibility of nature, the harmony of the All, the indivisibility of nature, the irrefragable necessity of natural processes according to immutable laws, and the freedom or independence of nature, as having its cause in itself, uncreated and uninfluenced by any extramundane being.

Natural science alone, according to the authors, is not sufficient to constitute the new world-conception. A one-sided view of natural science together with the obsolete conceptions of theism are exactly what has brought forth the philosophical pessimism of our time. Natural science, accordingly, is not to be regarded as the sole source of truth; it is to be corrected by pantheism. The former teaches us "to regard matter and its motion, so to say, as a dead inert substance to which motion is attached; it treats matter as an immediate reality. Pantheism, however, teaches that matter is to be conceived as the interrelation of the innumerable live acts of will appearing successively in time and side by side in space," etc. The authors point out that the necessity of law which regulates the mechanical processes of nature does not exclude freedom; for "freedom is not arbitrariness but is controlled by an immanent *Gesetzmässigkeit*."

This summary is sufficient to characterise the ideas of the Drs. Friedländer and Berendt. We cannot say that they admit of no criticism, (e. g. their conception of natural science must be pronounced as too narrow if not actually erroneous, nor should the law of the survival of the fittest be interpreted in the sense that strength means brutal force,) but we can, nevertheless, express our sympathy with the aim of the authors as well as with the spirit in which they pursue it. κρς.

DIE PHILOSOPHIE UND DIE SOCIALE FRAGE. By *Gustav Engel*. Leipsic: C. E. M. Pfeffer. 1892.

ACHT ABHANDLUNGEN, HERRN PROFESSOR DR. KARL LUDWIG MICHELET ZUM 90. GEBURTSTAG ALS FESTGRUSS DARGEREICHT VON MITGLIEDERN DER PHILOSOPHISCHEN GESELLSCHAFT. Leipsic: C. E. M. Pfeffer. 1892.

WIE STEHT ES JETZT MIT DER PHILOSOPHIE, UND WAS HABEN WIR VON IHR ZU HOFFEN? By *Dr. Wilhelm Paszkowski*. Halle a. S.: F. Beyer, 1892.

This lecture by the well-known writer on the science of statistics and its related subjects was read before the Philosophical Society of Berlin on the 31st of May, 1890. It discusses the problem of socialism, or rather the aspirations of the German social democracy from the philosophical point of view of the lecturer, which is a modernised Hegelianism. This lecture drew forth on the evening of its delivery considerable discussion, which was participated in by Herr Kahle, a socialist, and Herr Runze. The discussions of these gentlemen, together with Mr. Engel's reply, are embodied in the pamphlet.

The second of these two pamphlets is also a publication of the Philosophical Society of Berlin. It consists of eight treatises, essays, or lectures, which were pre-

sented by the members of the society to Prof. Karl Ludwig Michelet as a festival gift on his ninetieth natal day. The authors of these eight essays are: Adolf Lasson, August Cieszkowski, Gustav Engel, Friedrich Kirchner, Wilhelm Paszkowski, Max Runze, Georg Ulrich, and F. Zelle. They deal with philosophical subjects, chiefly such as pertain to the Hegelian philosophy. Appended to the pamphlet is a bibliography of the writings of this Nestor of the Philosophical Society by F. Ascherson.

The author of the third pamphlet complains about the decay of philosophy: "Metaphysics, the inner fane in the temple of science, stands desolate," and the last disciples of Hegel can no longer prevent the deluge which sweeps away the idealism of their grand old master. κρς.

DER MATERIALISMUS, EINE VERIRRUNG DES MENSCHLICHEN GEISTES, WIDERLEGT DURCH EINE ZEITGEMÄSSE WELTANSCHAUUNG. By *Dr. Eugen Dreher*. Berlin: S. Gerstmann. 1892.

The author of this pamphlet, at present a docent at the University of Halle, feels somewhat oppressed by the materialistic tendencies of our times. His desire is to establish in the world a province of the ideal, and this domain of idealistic aspirations and hopes, he says, must and can be based upon a scientific foundation. To reach this goal, the author propounds a philosophy which is confessedly dualistic, and which must be made a kind of religion. Descartes's *Cogito, ergo sum*, is to him the beginning of all philosophy. The existence of the All is devoid of sense, unless there is an ego to think it. This dualism, if made a religion, will throw light upon the problems of the labyrinth of life.

The aspirations of the author are serious and noble. We cannot, however, agree with the results of his reasonings. He does not seem to have considered Kant's objections to the fallacy of the *cogito, ergo "ego" sum*. Nor is he familiar with Lichtenberg's famous remark, that "we should say by rights 'it thinks,' exactly as we say 'it rains.'" The same moral conclusions at which the author arrives may be reached, the same province for ideal aspirations in the world may be gained, the same religious comfort may be found, without any surrender of the monistic view of the world. Materialism is an error of human thought. But the error cannot be cured by dualism. κρς.

UEBER DIE GRUNDFORMEN DER VORSTELLUNGSVERBINDUNG. Psychologische Studie. By *Max Offner*. Marburg: R. Friedrich. 1892.

This little brochure is a carefully worked out study of the phenomena of association. The author's view is summed up in the following statement: "The attempt to reduce the phenomena of association, in conformity with their real nature, to one single ultimate process cannot be regarded as successful, and we shall have to control our aspirations after a unitary conception and rest satisfied with reducing the various phenomena of association to two processes which are closely

"related, namely: (1) to an association of simultaneity; and (2) to an association of "immediate succession." There is much that is suggestive in the sixty-seven pages of this pamphlet. κρς.

FINITE HOMOGENEOUS STRAIN, FLOW, AND RUPTURE OF ROCKS. Bulletin of the Geological Society of America. By *George F. Becker*. Rochester: Published by the Society. 1893.

This is a purely technical research, concerning the causes and form of the discontinuity of rock masses. The studies presented are the outgrowth of field-work in the Sierra Nevada of California. This range is so intersected by false joints, schistose and slaty cleavages, that on a scale of one mile to the inch their average separation would be for the most part microscopic. The dynamic manifestations in these regions are very systematic. Some of the strains which have produced this phenomenon have been infinitesimal, and others have been finite. Only the latter are here treated. Finite strain, the relations of stress to strain, the nature of finite shear, viscosity, flow, plasticity, ductility, and rupture, the relation of plastic solids to fluids, the spacing of fissures formed by inclined pressures, jointing, and slaty cleavage, are the chief subjects discussed. The most important result of the investigation is that jointing, schistosity, and slaty cleavage all imply relative movement and are thus as truly orogenic as falls of notable throw. "In the light of this con-"clusion," says the author, "it appears that if one could reproduce the orogeny of "the Sierra in a moderate interval of time on a model made to a scale of one mile "to the inch, it would seem to yield to external and bodily forces much like a mass "of lard of the same dimensions."

This pamphlet is neatly got up, and reflects credit upon the author and publisher. μκρκ.

DER ECHTE UND DER XENOPHONTISCHE SOKRATES. By *Karl Joël*. Volume I. Berlin: R. Gaertner. 1893.

There are two sources from which we have derived the main bulk of our knowledge concerning Socrates; namely, the writings of Plato and Xenophon. The former is generally regarded as an idealiser, and the latter as an historical biographer; for Plato simply uses the impressive figure of Socrates to expound his own philosophy, while Xenophon, the general, the politician, the historian, is supposed to give in the "Memorabilia" a simple and faithful account of what appeared to him worthy of being preserved. As Xenophon was not a philosopher himself, it is tacitly assumed that he had no reason to alter, to suppress, or to add his own personal views to the historical account of the great master whom he bore in grateful remembrance as a faithful disciple. There are some other sources; but they are less rich than those of Plato and Xenophon. Among them must be mentioned several passages in Aristotle, especially in "Magna Moralia" I, p. 1182, *a* 15. Our author urges with

good reason that the Xenophontic Socrates is radically different from and even opposed to the real Socrates, and that we ought to rely more on Aristotle than on Xenophon. Xenophon's "Memorabilia," Karl Joël declares, is not an historical writing but a *Tendenzschrift*, and we have to be on our guard wherever Xenophon's special tendency comes in.

Socrates is the representative of the philosophical spirit of Attica, and the character of his teachings may in a word be described as a noble and sublimated subjectivism. Socrates is a rationalist and as such he opposes the mysticism of the soothsayer and mantic. He goes so far in his rationalism as to identify knowledge and virtue. He cannot understand, from his point of view, (which regards the soul as a rational being only and leaves out of sight the existence of impulses,) that a man can knowingly neglect to choose the better thing and choose the worse. Plato, in order to avoid the error of Socrates, invented the distinction between the rational and irrational part of the soul and Aristotle criticises Socrates saying *τὰς γὰρ ἀρετὰς ἐπιστήμας ἐποίει*.

The subjectivism of Socrates appears in his trust in the *δαιμόνιον*, the divine voice within his soul, his rationalism in his constant request to gather information before beginning to act. He exhibits in his talks great irony; for instance, when telling a politician that as a shoemaker must know his trade before making shoes, so he, the politician, ought to know *his* business before undertaking to manage affairs of state. Again and again he satirises the bungling levity of men who imagine that in the greatest and gravest things of life they can act without any information. Both the subjectivism and rationalism of Socrates appear in his constant inculcation of the Delphian motto "know thyself."

What a different character is Xenophon! He was a convinced believer in manticism. There are more than a hundred passages in his writings in which not rational forethought but the art of the soothsayer is left to decide the most important questions of practical life. When the courageous ten thousand offered him the leadership in their dangerous retreat, his ambition urged him to accept, but he first asks the God, and the omens being unfavorable, he refuses. He did not accept the offer until he had received another more auspicious omen. In the same way Xenophon acts throughout. All important decisions which prudence would urge, are made dependent upon sacrifices, dreams, or the flight of birds, and more than once the safety of the army is greatly endangered by a fatal passivity caused through unfavorable omens which prevent Xenophon's acting with decision at the right moment. It is no exaggeration to say that these ten thousand Greek soldiers escaped only by good luck the fate of the Athenian army in Sicily under Nikias. And this man, a zealous believer in manticism, should be an impartial and reliable historian of the doctrines of Socrates? The *δαιμόνιον* of Socrates is changed into a mystic power, a kind of *spiritus familiaris*. It has ceased to be the divinity of man's inner self as which it appears in Plato's account, and is represented by Xenophon as some peculiarity of Socrates which was given him as a special favor by the gods. Socrates

dethroned the old fate that was supposed to rule the affairs of men and pointed out the importance of knowledge, for through knowledge we can learn to regulate our fate ourselves. The philosopher who thought little of well-being, of *εὐτυχία*, and demanded above all a well-doing, an *εὖ πράττειν* ("Memorabilia," III, 9, 14, 15,) did not recommend asking soothsayers questions where we should better ask ourselves, although it is probable that he recommended the Athenians to apply to the Delphic oracle instead of relying upon omens not so much because he believed in prophesies, but because he thought that they would be influenced by the authority of this venerable institution whose wisdom and conservative spirit were beyond question, so that good advice could be expected from it. Karl Joël, accordingly, advises us to read the "Memorabilia" with an inversion of the points, viz., to convert the sentences qualified by "although" and "to be sure" into the main sentences and *vice versa*. In this way we shall be able to distinguish between the pagan orthodoxy of Xenophon and the rationalism of Socrates. Why does Xenophon not state directly and simply (1) Socrates advised his friend to ask the oracles in all cases of uncertainty, (2) manticism is indispensable in the economy of a household as well as of a state, and (3) the gods have not granted us any real knowledge as to a final success and reveal it through special revelations. Why must he add long sentences introduced by "although"? He adds to (1) that everybody ought to act solely according to his own conviction, to (2) that all the trades up to the highest professions had to be learned before practiced, and to (3) that those who inquired at the oracles for things which could be learned and studied in the usual way are crazy and even blasphemers.

This sketch may suffice to characterise the book which is much better than could be anticipated after a perusal of the preface, which almost induced us to lay it aside unread. It is not the modesty of the author which produces a prejudice but the random talk concerning things which neither a reader nor a reviewer will care to know. The author has apparently no talent for writing prefaces, and he would be wise to omit them in the future entirely. The book might be very much condensed, repetitions avoided, and an alphabetical index certainly should have been added.

It contains *five hundred and fifty-four* pages; and the author says he is preparing a *second* volume. We think it would have been better for his views if he had expressed them in a pamphlet. κρς.

A Perplexed Philosopher. Being an examination of Mr. Herbert Spencer's various utterances on the land question, with some incidental reference to his synthetic philosophy. By *Henry George*. New York: Charles L. Webster & Company. 320 pp.

The "Perplexed Philosopher" herein described is Mr. Herbert Spencer, and persons who like ginger in their ale will enjoy this book; for its eloquent invective, hot from the heart, cheers us like that stimulating drink. Because of this fiery and

revengeful attack on Herbert Spencer much dignified reproof has been aimed at Mr. George by those excellent people who religiously forgive the injuries done to others, and allow only to themselves the luxury of retaliation; but when we consider the provocation given by Mr. Spencer, this counter-blow of Mr. George is mild. Mr. Spencer had a critic's right severely or tenderly to condemn the doctrines of Mr. George; and had he kept himself within his privilege Mr. George in reply would not have had any right to assail the personal character and motives of Mr. Spencer; but the older philosopher chose to treat the younger with supercilious disdain, and this was a personal affront that fully justified a retort personal. Scorn is an ignoble argument, lawful only in return for scorn.

Apart from the truth or error they contain, the writings of Mr. George have achieved a phenomenal popularity; their influence on social opinion has been in some directions almost revolutionary; they are to-day the political creed of many men in different parts of the world, and especially of many thousands in America, Great Britain, and Australia. They are bold in theories, attractive in illustration, and admirable in their literary form. Their approval of "Social Statics" was an advertisement that multiplied by hundreds the readers of that book, and there is no philosopher great enough to affect ignorance of Mr. George's writings, or to dismiss them with a sneer. More copies of "Progress and Poverty" have been sold than of any other book on social economics that ever has been written, and when Mr. Spencer spoke of that book as "a work which I closed after a few minutes on finding how visionary were its ideas," he put on airs of aggravating superiority which naturally provoked the resentment of Mr. George.

After not reading the book Mr. Spencer condemned its heresies and said:

"There is the movement for land nationalisation pressed by Mr. George and "his friends with avowed disregard for the just claims of existing owners. . .

"And now this doctrine (that society as a whole has an absolute right over the "possessions of each member) is being openly proclaimed. Mr. George and his "friends, Mr. Hyndman and his friends, are putting their theory to its logical issue."

To that Mr. George replies as follows:

"In nothing I have ever written or spoken is there any justification for such a "characterisation. I am not even a land nationalisationist as the English and "German and American nationalisationists well know. . . . I have been a staunch "denier of the assumption of the right of society to the possessions of each member, "and a clearer and more resolute upholder of the rights of property than Mr. Spen-"cer has been."

Without waiting to inquire whether Mr. George includes within the "rights of property" the right to property in land, it is enough to say that here at least Mr. Spencer is at a disadvantage. He disarmed himself before going into battle by refusing to read Mr. George's writings, and scorning to examine them he accused them of communism, confiscation, and land-nationalisation. Mr. Spencer cannot now strike back for he has thrown his weapons away. He is a prisoner in the hands

of Mr. George, who couples him with Parson Wilbur denouncing a print called the *Liberator*, "whose heresies," he said, "I take every opportunity of combating, and of which, I thank God, I have never read a single line." The parallel is well drawn; and the lesson of it is this, never challenge a man and then treat him with contempt; if you think he is not a foeman worthy of your steel, let him alone.

Had Mr. Spencer studied the works of Mr. Henry George, he would have found in them some doctrines having a manifest family likeness to communism, confiscation, and land-nationalisation; but they avail Mr. Spencer nothing, because he would not condescend to read the chapters where those revolutionary principles are. If he would bend his brow a moment and examine them he might find that in this controversy there are two perplexed philosophers instead of one. In the book before us Mr. George remarks:

"It is this confusion of Mr. Spencer as to rent and value that has led him into "confusion as to the right of property; and that, at first, at least prevented him "from seeing that to secure the equal rights of men to land, *it is not necessary that "society should take formal possession of land, and let it out*, and consequently, that "the difficulties he anticipated in taking possession of improved land were imag-"inary."

But, in "Progress and Poverty," Chapter II, he said:

"We should satisfy the law of justice, we should meet all economic require-"ments, by at one stroke abolishing all private titles, declaring all land public "property, and *letting it out to the highest bidders in lots to suit*, under such condi-"tions as would safely guard the right to improvements."

The italics are ours, directing the attention to apparent contradictions which it is for Mr. George to reconcile. And, if English words have any meaning, "abolishing all private titles" means confiscation; and "declaring all land public property and letting it out to the highest bidders," is land-nationalisation; at least, the ordinary reader may innocently think so, yet Mr. George declares that he is not a land-nationalisationist.

As a personal defense and explanation Mr. George has a right to say that he is not a land-nationalisationist, or a communist, or an "ist" of any other kind, and we are bound to take his word for it, but in this dispute that matter is wholly immaterial. The question before the meeting is this, Is Mr. George's book a land-nationalisationist or is it not? Is it a confiscationist or not? In "Progress and Poverty" Mr. George explains his meaning thus:

"I do not propose either to purchase or to confiscate property in land. The "first would be unjust, the second needless. Let the individuals who now hold it "still retain, if they want to, possession of what they are pleased to call *their* land. "Let them continue to call it *their* land. Let them buy and sell and bequeath and "devise it. We may safely leave them the shell if we take the kernel. *It is not "necessary to confiscate land; it is only necessary to confiscate rent.*"

The italics are by Mr. George; and a little farther on, he says;

"That is the first step upon which the practical struggle must be made. When "the hare is once caught and killed, cooking him will follow as a matter of course."

And several years afterwards, in "Protection or Free Trade," page 302, Mr. George describes the artful mechanism of the snare by which the hare is to be caught and killed:

"Now it is evident that, in order to take for the use of the government the "whole income arising from land just as effectively as it could be taken by formally "appropriating and letting out the land, it is only necessary to abolish, one after "another, all taxes now levied, and to increase the tax on land values till it reaches "as near as may be the full annual value of the land."

In that paragraph "government" is merely another word for "nation," and the taking away from private owners all the lands of the country "for the use of the government" is land-nationalisation, whether the taking be done boldly by imperial decree, or furtively by taxing it up to its "full value" and out of the hands of its owners.

The discrimination above made must apply to Herbert Spencer as well as to Henry George. Mr. Spencer has a right to qualify and explain as much as he pleases; he may properly say what he thinks now about the right of land-ownership, but the question at issue is this, What are the opinions of "Social Statics" upon the land question? Are they not in principle, and very nearly in expression the opinions of "Progress and Poverty"?

It is not to be denied that "Progress and Poverty" found moral support in "Social Statics." In fact, the disciples of Henry George, whenever their doctrines were assailed, brought Herbert Spencer into the field as a reinforcement. This, at last, gave Mr. Spencer great annoyance, and in a moment of irritation he determined even by a qualified recantation to withdraw the reserve brigade on which "Progress and Poverty" had so long depended for assistance. Hence, his letters to the *Times* and the *St. James's Gazette*, and the modification of his views which appears in "Justice." He tried to do this by dropping Mr. George to the ground, while endeavoring to stand on consistent feet himself; and this it is that inspires the vehement criticism of Mr. George.

With a scalpel most logically keen Mr. George has dissected Mr. Spencer's philosophy of land, and with almost Indian exultation he exposes its eccentricities and contradictions. As was inevitable, for we cannot get along without it, the old familiar Galileo moral is brought in by Mr. George to prove that "still it moves." He is right; for if it is ethically and politically true, as declared by Mr. Spencer in 1850, "that equity does not permit property in land," it will be true forever, and no extremity of recantation can make it false. The attempt of Mr. Spencer to show by duplicate metaphysics that his later opinions concerning land are not inconsistent with the occult meaning of "Social Statics," is a failure. It cannot stand a moment before the searching analysis and legible comparisons of Mr. George.

The attempt to resolve a concrete subject, such as government ownership of land, into abstract terms of justice limited or expanded by the right of some private person to the house on the land, and the barn, and the well, and the fences, and the apple-trees, and other appurtenances, corporeal and incorporeal, has involved Mr. George himself, as well as Mr. Spencer, in some confusion of thought, and has entangled both of them in varieties of statement not easy to reconcile. This might be due to obscure definitions and multiplied explanations, or to changes of opinion, but Mr. George asserts that Mr. Spencer's inconsistencies are the result of moral and intellectual dishonesty, prompting him to explain away his principles to propitiate the landlords and other aristocratic persons who admitted him into their high society after he became eminent, and before they knew that his philosophy denied the right of private property in land.

In his letter to the *Times*, apologising for "Social Statics," Mr. Spencer said:

"The work referred to—"Social Statics"—was intended to be a system of "Political Ethics—absolute political ethics, or that which ought to be, as distin-"guished from relative political ethics, or that which is at present the nearest prac-"tical approach to it."

And then the philosopher becomes a politician and frames for the landed and the landless a moral code, ambidextrous and elastic as a party platform. Duty, justice, right, and truth, lose all their absolute qualities, and become relative to expediency and our own convenience. He teaches us to oppose wrongs until they become vested rights and then defend them. He makes ethics changeable as our coats, and the man who can afford two suits of clothes may have two suits of ethics, an "absolute" suit for Sundays and a "relative" suit for every day; an "abstract" suit for wearing about the house, and a "practical" suit for business purposes. He may wear a suit of "pure" ethics when buying, and a suit of "applied" ethics when selling; and so, at last, by those harlequin morals, it happens that what we ought to do has no relation at all to "that which ought to be." Those pure subtleties and applied subterfuges make Mr. Spencer an easy mark for the indignant sarcasm of Mr. George, who shows what Mr. Spencer thought of absolute and relative ethics when he said in "Social Statics":

"When a man admits that an act is 'theoretically just,' he admits it to be "that which, in strict duty, should be done. By 'true to principle' he means in "harmony with the conduct decreed for us. The course which he calls 'abstractedly "right,' he believes to be the appointed way to human happiness. There is no "escape. The expressions mean this or they mean nothing."

The book is written in an angry vein, and the nicknames "traitor," "juggler," "apostate," and the like, add nothing to the value of its argument; they only give bitterness to the censure. They are not to be commended, although they ought to be excused, for they sprang out of "a tempest of provocation." Mr. George has been fighting under the banner of Herbert Spencer, and he feels like a soldier whose general deserts him in the battle and then disowns him altogether.

The only rational explanation of Mr. Spencer's letters to the *Times* and the *St. James's Gazette* is that he has radically changed his opinions about the private ownership of land; and his timid, uncertain, and equivocal way of saying so makes him look very much like the "perplexed philosopher" that Mr. George describes. At the same time it must be noticed that Mr. George himself is not so radical in this last book as he was in "Progress and Poverty." His principles appear to be the same, but in the application of remedies he is milder than he was about fourteen years ago. When he reaches Mr. Spencer's age he may be just as conservative and "perplexed" as that philosopher is now. M. M. TRUMBULL.

PERIODICALS.

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We cannot be accused of having any penchant for Theosophy or Spiritualism and find little occasion to praise their productions, which are usually crude and illiterate. But we must confess that Hübbe-Schleiden's review, the *Sphinx*, is greatly superior to anything in this field we have ever seen. There is artistic taste about it; there is, so far as its position admits of, a certain contact with positive science; there is an attractive popularity without shallowness. All these means are skilfully employed by the editor to impress his ideas, erroneous though they may be, upon his public. If the magazine appeared in English, instead of German, it would at once become the recognised leader in its field.

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THE MONIST.

NATIONALISATION OF EDUCATION AND THE UNIVERSITIES.*

A LITTLE more than a century ago it was universally believed that, in the nature of things, the vitality of a republic and its size stand in an inverse ratio. The inadaptability of a republican system of government to a state of vast territorial expanse and with a very numerous population was considered an almost axiomatic, i. e. self-evident, truth. When the thirteen English colonies in North America had taken the bold resolution to transform themselves into the United States of America, many an ardent patriot often asked himself, not free from anxious foreboding, whether the Union was within the limits laid down by irreversible political laws, as the utmost extent of republics fit to endure. If it had not been for the size of the country, the doubts as to whether the republican experiment was likely to prove a success, would never have assumed a character, which gave sufficient color to the charge of monarchical tendencies, to make them appear well-founded in the eyes of so many people. When afterwards a new empire was to be added to the Union by the Louisiana purchase, the doubt, as to whether the republican system of government would be equal to the strain put upon it by such an immense enlargement of the area of the United States, played a not unimportant part among the objections of the opposition. That experience has definitively disposed of these ideas,

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by proving the apprehensions to be unfounded, is no reason to think meanly of the political discernment of those who entertained them. It will not be universally admitted, that experience has thus far proved them to be wholly unfounded also as to consolidated republics. And how can it be wondered at, that at that time the essential difference was not fully realised and understood, which exists between a federal and a consolidated republic with regard to the peculiar dangers and evils apt to arise from this specific cause. Though republican federations had been known to the world for two thousand years, no instruction was to be derived from their history on this head. As to the extent of territory, the consolidated Roman republic, which had consumed its vitality with its growth, could alone be compared with the United States; and as to many of the essential features of their political structure, neither modern nor ancient history furnished an analogy. In the soil of the New World, the germs of European institutions had—adapting themselves to the new conditions—developed into a new type of commonwealth.

It is conceded on all sides that, next to the capacity of the American people for self-government, the United States owe it primarily to the happy blending of the principles of National Union and State Independence that, taking all in all, hitherto their history has been the most striking and convincing vindication of republican institutions; and it is hardly questioned that, but for the happy blending of these two principles, a republic comprising half the North American continent and possessed of all the requisites of vitality never would nor could have existed. Upon their being "an indestructible Union of indestructible States," the vitality of the United States absolutely depends. That, with this principle as the foundation, the domain of a republic *can* be almost indefinitely extended, without thereby destroying its vital energies, has been irrefutably demonstrated. But does that mean, that the United States have definitively solved the problem of keeping the vital forces of a republic covering a vast area unimpaired? By no means. Only the preliminary question has been settled by them for all time to come, what the indispensable prerequisite of its solution is, and they have thus far succeeded in preserving their vitality. But even

as to themselves, the solution of the problem itself has to be repeated over and over again, not only by generation after generation, but every year and every day. The hour never will, never can come, when the American people can, with impunity, say: the task is accomplished; let us rest and enjoy the fruits. It never can come, because the problem itself is in a continuous state of transformation. Though the changes be so slow, that they are imperceptible to the keenest eye trying to follow them up from year to year, they are none the less real, and if they are not duly heeded, the penalty will have to be paid some time in one way or another. While the fundamental principle, the blending of National Union and State Independence, is irreversible, the attempt to make its application immutable, would be fatal. I say the attempt, for actually to do it, is, in the nature of things, impossible. The American people are not only constitutionally a nation. The civil war did not result in the permanent disruption of the Union, but in welding it more indissolubly together, because, with the single exception of slavery, the facts coincided with the law. In spite of the tremendous sectionalising influence exercised by slavery, the nationalisation in feeling, thinking, and interests had made such progress under the operation and protection of the law of the land, that it could stand as severe a test, as any consolidated State can boast of having stood. The causes, to which it was due, that the facts were in conformity with the law, have been ever since unremittingly at work,—the countertendencies have disappeared with the abolishment of slavery,—and, independent of that, those causes are every year acquiring a greater force. The actual nationalisation, therefore, goes steadily on, whether we like it or not, and though the constitutional nationalisation be allowed to remain unchanged. While the legal status under the Constitution may not be altered for ever so long, we are confronted by constantly changing conditions. If we do not conform in what we do and leave undone to the irrepressible changes of this evolutionary process, the maintenance of the principle of blending National Union and State Independence will avail us but little. The vital energies will dry up and ebb away, for while we have kept the form, we have become strangers to the spirit which renders it a

magic force. Nor ought the dividing line between political parties to run, as in days of yore, on the question of State rights and consolidation. All discriminating patriots must be as well State rights men as consolidationists, respectively conscious supporters and promoters of further nationalisation. Where and how ought State independence to be strengthened, so as to prevent an over-consolidation by the silent working of those nationalising causes, which it is impossible to stem? and: Where and how ought consolidation, respectively nationalisation, to be promoted, in order to make the working of those nationalising causes conducive to the true interests of the people and to the invigorating of republican institutions? These are the two questions which the American people have constantly to ask themselves. On the discretion and discernment displayed in trying to find the correct answers must it depend, whether the federative principle will work as well in the future, as it has done in the past.

If these propositions must be admitted, it can be proved that in no respect is conscious and systematic nationalisation more imperatively needed than in regard to education. At first sight this assertion may seem worse than extravagant. I am, however, not afraid to submit my case to the jury of the American people, if I am but conceded the legal right of every criminal, to be heard ere I am judged.

Education is the bed-rock on which this republic rests. However excellent its political institutions be, its decay and ultimate downfall is inevitable, if the people fail to do their full duty by themselves in this respect. For, in a democratic republic, political institutions are live forces only so far as the people have the mental and moral requirements for working them well, and these mental and moral requirements can be attained only by education. It is, therefore, in the strictest sense of the word, a *vital* question for the republic that every one of its sons and daughters receive not only some schooling, but that the education of all be proper and adequate. That is a tremendous task. It constantly grows in scope and intricacy, and at the same time, it becomes of more and more import that it be well accomplished. With the people rests the ulti-

mate decision in everything, and the problems confronting the commonwealth are assuming more and more a character, taxing the highest statesmanship to the utmost. Thus the claims upon the intelligence and the moral soundness of the people are fast being strained far beyond anything ever known by any former generation in this or any other country. And lack of the required intelligence and moral soundness in any one State necessarily affects the whole Union. A State that is derelict to its duty in the education of its people, wrongs not only itself, but also the nation. By its share in the federal government, every State is directly instrumental in laying down the law for the whole country. All the States are thereby made to participate in the payment of the penalty for its intellectual and moral deficiencies. This is, however, by no means the only way in which they are made to suffer by them. What the law does with regard to everything rendered federal by the Constitution; commerce, travel, and interchange of population do in other respects. They are unremittingly and with ever increasing intensity at work, multiplying and rendering more close the organic relations between all the parts of the vast domain, every water-way, railroad-track, and telegraph line performing the functions of the veins in the animal organism. If the blood be poisoned in one limb, the virus cannot be prevented from working its way into the whole system.

To admit that education is in the highest degree a national *interest*, and to deny its being a national *concern*, is, however, a self-contradiction. To contest either the right or the duty of a nation to acknowledge every national interest a national concern, and to deal with it accordingly, is a palpable absurdity. Not as to the Whether, but only as to the How, can the people be restricted by the Constitution. A constitution imposing upon the people an injunction to minister to the needs of the commonwealth, would be as great a political monstrosity as a constitution providing for the dissolution of the state.

This doctrine will not be allowed to pass unchallenged. I shall be asked whether I set myself against the universally accepted fundamental principle of American constitutional law, that the federal government has no powers but those granted to it by the Constitu-

tion. I do not. "Where, then," my interlocutor will go on, "do you find the express grant or the implied power?" Nowhere. "Then you advocate a constitutional amendment to the effect indicated by you?" I do not. I know that such an amendment could not get the vote of a single state, and if there were a possibility of its being adopted by the constitutional number of states, I should be found, to the last, among those fighting it tooth and nail. I can hardly conceive of a more suicidal measure than the adoption of such an amendment. Just because education is the bed-rock on which the republic rests, is it of vital importance that it does not become a federal affair. Self-reliance and responsibility are the main pillars supporting a democratic commonwealth. Kill, in the people of a state and the population of its subdivisions, the habit of self-reliance and the sense of responsibility in regard to the substratum of the whole political and social structure, and they will wither and shrivel up in regard to everything else. The compulsion to tax themselves directly for the establishment and maintenance of schools and the being in close touch with those entrusted with the direction of the educational work are an inestimable boon to the people.

Even if it were economically possible to do without direct taxes, political reasons would peremptorily forbid their abolishment. On account of their moral effect, no state could dispense with them, and least of all a democracy. All indirect taxes are paid more or less unconsciously; the people, however, must be kept conscious that the public purse means their own pockets. The more they lose sight of this, the wider the door is opened to paternalism, and paternalism is a more deadly enemy of liberty than despotism and tyranny. These, if any vitality be left in the people, ultimately kindle the desire for liberty, while paternalism acts upon it as an opiate and ends by killing it through the systematic enervation of self-government. If this is to be kept alive not only in form, but also in essence and in spirit, the people must constantly be held to teach themselves in illustrating by their own acts the irrefutable truth, that not the rights, but the self-imposed duties are the vital principle of true democracy. Nothing, however, is more apt to drive this all-important fact irresistibly home, implanting it ineradi-

cably in their whole feeling and in their conscious thinking, than the necessity to vote, as directly as possible, out of their own pockets the money required for preserving intact and in vigor the prerequisite of *all* that is needed for the preservation of the nation's vitality. If it be not deemed irreverent, I should say that every dollar a man voluntarily votes out of his pocket to provide for the educational needs of the community, preaches to him a political "Sermon on the Mount." "Liberty and self-government," it says, "must be paid for;—state and society are in their very essence ethical conceptions;—they must totter, fall, and crumble to pieces, unless they rest on an ethical foundation;—to preserve, broaden, and deepen this foundation, by providing for the required intellectual and moral equipment of the generations in whose hands the future destinies of the commonwealth will lie, is the paramount duty of the people;—no one has the right to exempt himself from doing his share in the fulfilment of this duty, for the heirloom of the past, enjoyed by the present, is but a trust to be left, with accrued interest, to the future;—the fulfilment of this duty ought to be considered rather a privilege than a sacrifice, for every farthing paid for the maintenance of the humblest village school is an integral part of the nation's life-insurance premium;—glory in this responsibility to the whole country, for it constitutes you, with the wealthiest and mightiest, a joint builder of its greatness;—glory in thus bearing witness by the fruit of the sweat of your brow, that you, too, are sworn in on the creed that man does not live by bread alone;—glory in and render thanks for being thus held to keep ablaze in your own bosom and help kindle in the bosom of the lowliest child of the community, the sacred fire of idealism."

That by many, perhaps by most people, this appeal is not heard in distinct words, I do not contest. But that is no reason to make light of it. Utterly lost it never is. Something of it sinks into the mind even of the dullest and most hard-hearted, though it be but in the form of a faint and vague feeling. To make them lose this, is to deprive them of the best they have. Democracy is not a mill-pond, on which a fragile boat can outride the wildest tempest. It is the open sea, on which the proudest and stoutest craft is sure to

be swamped, sooner or later, if it be not properly ballasted. True idealism, however, never was a more essential part of the ballast, than in these times and in this country. It stands more in need of it than any other state, because its unparalleled opportunities are appallingly powerful incentives to plunge headlong into the materialistic tendencies of the age. Therefore, it is ruthless to lay hands on anything tending to keep alive and foster true idealism in the people. For this reason it would be, in my opinion,—not in intention, but in effect,—a dastardly crime, under any plea whatever, to release the people from the obligation to provide in their local organisations for the education of their youths.

Therefore, I even deem it upon the whole more beneficial than detrimental that many of the higher and most of the highest educational institutions of the country are the free gift of high-minded men and women to the people. I have never agreed with those who have contended in this country that the duty of the commonwealth does not extend beyond providing for primary and, at the most, to some extent for secondary education, and that it would not be fair and proper to tax all for the establishment and maintenance of colleges and universities, which, in the nature of the case, only a small minority can frequent. It would be hard to name a more promising sign of the times, than that this doctrine has of late lost so much of its former hold upon public opinion, that one would have to search long for an advocate of it in its original rigor. It is eminently in the interest of all, that there be an ample number of men and women who have received the highest education. Therefore, it is evidently not only justified, but imperative, that the commonwealth furnish the means for supplying its want. But if the views held in this respect on the continent of Europe had prevailed in the United States, the American people would have been the poorer of one of the vastest and most grateful fields for manifesting idealistic public-spiritedness. An inestimable loss, for idealistic public-spiritedness is not the least of the causes to which it is due that American democracy has stood the test; and idealistic public-spiritedness, like every virtue, grows stronger and more fruitful by being practised. Every donation for educational purposes prompts others to

follow suit, and is, apart from its direct beneficent effects, a most valuable object-lesson to the whole nation. With equal impressiveness, the rich and the poor are reminded of the treasures which "neither moth nor rust doth corrupt." On every educational institution brought into existence in such a way are indelibly inscribed the two magic words to which this country owes it greatness: Help yourself, and Public Spirit; every one of them is a living protest, as well against paternalism—whether it present itself in the socialistic or in any other garb—as against the setting up of the golden calf as the idol of the republic. Therefore, everything tending to seriously check these manifestations of idealism and public spirit in regard to higher education would be deplorable, even if it were in itself commendable, for paternalism and materialism are too rampant to leave anything undone that is calculated to keep them down.

To contend that the existing decentralisation in regard to education must be done away with, would, for these reasons, be a truly Quixotic charge upon windmills: the venture must result in broken bones. It cannot, and, if it could, ought not to be done, for this decentralisation is the natural outgrowth of the whole historical development of the commonwealth and in perfect accordance with the underlying principle of its political and social structure. But it would be strange logic to conclude from this that it can have worked no harm, or that the evil consequences it may have had cannot be remedied. Can it be denied that, apart from the primary schools, it sounds almost like mockery to speak of an American system of education? If we look at the schools of a higher grade, we are confronted by a bewildering chaos, and the nearer the top, the worse the confusion becomes. That the effects of this are not altogether good, will be universally admitted, though opinions will differ as to the weight that ought to be attached to the bad consequences in the aggregate and severally. To me, some of them seem to be of a very serious character, and I hold that they must from year to year become of more consequence. To say that somebody has been through a "high school," does not convey sufficiently definite information as to either the kind or the amount of instruction he has received. To know that somebody is a graduate of an "academy," a "college,"

a "university," means to know next to nothing as to his mental equipment. To gauge our man, we must inquire, What academy, what college, what university? Having learned that, we are in hundreds of cases not a whit wiser than before. We have to ask for the calendar of the institution, and, after having read that, we shall often be still pretty much at sea, for, as the Germans say, "paper is patient," and the printing of a first-class programme implies by no means of necessity first-class instruction. This may be considered by some of little or no moment, because the degrees confer no rights whatever. But they are, nevertheless, not senseless gewgaws. If they be deemed such, their abolishment must be insisted upon, for then they are as much out of place in this country as orders or other meaningless titles. They are intended to be certificates of knowledge and mental training. If they lose this character, they are nothing, or worse than nothing. It is, however, self-evident that they must be deprived of this character, exactly to the extent that the educational institutions bearing the same name and conferring the same degrees differ from each other. Do you not think it more than likely that, if a law were passed making it obligatory to add to the letters indicating a degree the name of the institution by which it was conferred, an astounding number of ornamental tails to names would be cut off forever?

This would not be done, if the degrees merely failed to be definite and reliable certificates of knowledge and mental training. They do positive harm, because the institutions conferring them have little more in common than the name, their educational standard differing in the extremes, as much as the crippled shrub and the sturdy oak. While the public do not know what value to attach to the degree, a large percentage of the recipients are betrayed into offensive and pernicious self-deception. Upon the official averment of their *alma mater*, they lay the flattering unction to their soul that they have received a much better intellectual outfit than they really possess. These institutions practically reverse the precept of the Greek sage: not "know thyself," but "deceive thyself" is the maxim imprinted on their diplomas. And this self-deception is a subtle, contagious virus. It is at least doubtful, whether more will

take warning by looking through the false pretense, or be lured by it into the same mistaken notions as to the requirements of genuine higher education. To have practically no fixed standards for the different grades of higher education must as inevitably have mischievous effects upon the intellectual life of a people, as its economic life must be demoralised by allowing everybody to coin money of the same outward appearance, but of any alloy he pleases. Not that harm has been done by the almost unlimited freedom enjoyed by the educational institutions owing their existence to private munificence, is to be wondered at; it is astonishing that the deleterious effects have not been much worse. A premium is offered for sailing under a false flag. If a college may be called a university, and an academy a college, it would be more than surprising if the grander name were not frequently preferred, for it flatters alike the vanity of the donors, the instructors, and the pupils, and will—with more or less reason—be expected to work as a bait. With the name goes the right to confer degrees, and the exercising of this privilege is to serve the same purposes. But the name renders it necessary to keep up appearances, and that is an expensive pleasure. The masquerading in a pretentious guise cuts down the allowance of wholesome food. Worthless universities instead of good colleges, inferior colleges instead of satisfactory academies and fitting schools, are but too often the result. No name will deprive the rose of its sweet scent: but the buttercup cannot, with impunity, call itself a rose.

The worst, however, is, that even the best institutions of the higher order are made to pay a heavy penalty for the shortcomings of those of the lower rank. Not getting the proper material, they do not turn out as good work as they in themselves might do. Much valuable time, which ought to be devoted to going on with the building, must be spent in mending and strengthening the deficient foundation, which, after all, does not acquire the requisite solidity, because mending is necessarily patchwork. Nor is the damage confined to the pupils that have been sent up from inefficient schools. These act as a drag upon those who have come adequately prepared. To render matters worse, the deficiencies are neither the same with

all, nor is it known beforehand where they will be found and how far they will extend. Neither are the curricula the same, nor is there any guaranty that the same curriculum means the same work done. Here so many things have been taught, that everything has suffered in regard to thoroughness. There, specialisation has commenced so early, that the basis is too narrow and too shallow. Training for a special purpose has encroached upon education. All these difficulties greatly hamper the institution. But they do more. They exercise a strong pressure upon it to stray from the right path, for they are powerful incentives to yield to the evil tendency, more to measure, than to weigh the work done. This is, in my opinion, the most deplorable of all the bad consequences which the lack of a uniform system, resulting from the decentralisation of education, has thus far had; and it is all the more dangerous, because the measuring principle is so well fitted to be clad in the seductive garb of a lucid and clear-cut system.

I do not expect that every one of my propositions will be universally assented to. But can any unprejudiced observer dispute that there is enough truth in what I have said to prompt the people seriously to ponder the question, where this is going to end? If no conscious, energetic, and concerted effort be made to counteract the evil effects of decentralisation, the very fact of higher education having assumed such a kaleidoscopic character renders inevitable its becoming more and more kaleidoscopic. The founders, boards of trustees, presidents, and faculties of new institutions are almost compelled to give their individual notions on higher education, to a dangerous extent, free scope. Having a hundred different patterns presented to their consideration, the temptation is well-nigh irresistible not to adopt any one of them, but to devise a new one. A new experimenting laboratory is set up. That its experiments will be, positively or negatively, of some value, is to be supposed. In most cases, however, the public interest would have been better served by a good factory, renouncing the risky ambition of dabbling with new inventions.

A European is struck with wonderment that, considering the extent to which decentralisation in higher education has been car-

ried, not infinitely more harm has been done, and that the harm it does, seems to impress the Americans comparatively so little. Neither can be understood, unless one fully realises to what a degree the American commonwealth is still in its formative period, and what an astounding educational power there is in American life. To the former it is principally due, that the deleterious effects mentioned are here in fact of much less consequence, than they would be, where the advantages of an historical development, counting by more than centuries, are paid for by the rigidity of age; and the latter supplements and corrects the work of the schools so effectively, that it is not surprising to find even many a keen-sighted and highly accomplished American more or less blindfolded as to this. Because the ultimate results are satisfactory, it is taken for granted, that the educational conditions of the country must be all right, while a searching critical examination irresistibly forces upon one the question, whether a good deal is not achieved in spite of them. If this be so, failure to promptly attend to what is defective in them will surely be punished, for thanks to the rapidity with which the United States are being filled up, their formative period is fast drawing to a close, and with its close, the educational power of American life will be, in some important respects, very sensibly diminished. The peculiar advantages, they have thus far enjoyed, are steadily growing weaker, while intellectually and morally, the difficulties confronting the whole civilised world, and difficulties peculiar to them, are as steadily making greater demands upon the people. Growth of population and development of economical life, with all its attending circumstances, constantly working at the further nationalisation of the American people, and the problems to be solved growing more and more intricate, disaster must become inevitable, if education does not keep abreast of this double movement; and this it cannot do, if we do not energetically and systematically go to work to nationalise education without consolidating it. Nor have we any time to lose, for the task is by no means easy. Every inch of ground gained will be the price of an arduous and protracted struggle.

From the Federal Government no direct assistance is to be derived, for the question is not within the province of its constitutional

powers, and if it were, we ought not to ask its interference, because, as I said, to nationalise education without consolidating it, is to be the aim. Public opinion, unaided by law, must effect the reform. Public opinion, however, is in this country even more powerful than the law. It is sure finally to overcome not only all active, but even all passive resistance, which is always much harder to overcome. But is there any possibility of ever inducing public opinion to take the question up in full earnest? I am confident there is, and at all events it must be tried. The difficulty of the task is no excuse for not undertaking it. It only admonishes us, not to waste time, strength, and enthusiam in vain attempts to carry the fortress by assault. The works are so extended and so strong that only a methodical siege requiring a great deal of skill, patience, and determination, offers any chance of success. Two preliminary questions must, therefore, be answered, ere operations can be commenced: who is to conduct the campaign, and by what tactics can the approaches be pushed on the fastest?

The answer to be given to the first question is plain. The instructors are to be considered the experts, if anybody can claim the title. Upon them, therefore, devolves the duty to take the lead. This they have already commenced to do. The very existence of a National Educational (Teacher's) Association is in itself irrefutable proof that the opinions advanced by me, have, in some way and to some extent, asserted themselves for some time. How this has been done and what has been effected, I do not feel called upon to discuss. I merely state that while I appreciate what it has done and expect from it still more in the future, I am firmly convinced that the goal can never be reached if we are to content ourselves with what this organisation is capable of achieving. This will be deemed the less disparaging, if I furthermore state that, in my opinion, the end could no more be attained by any other organisation acting singlehanded. Hunting for any one device which will as certainly effect a cure as patent medicines claim to cure bodily ailments, is but to waste time. The evil has to be attacked from many points and in many ways, if sanitation is to set in.

While I am fully persuaded of this, I am, however, on the other hand as firmly convinced that nothing will be of avail if the Universities do not step forward, heading the column of attack and adding compulsion to suasion. The reform has to be worked from the top downward. At present the law is, to a great extent, dictated by the schools of the lower grade to those of the higher. This must be reversed. The Universities must insist upon getting the proper material for doing what in their judgment is the proper work. They must cease fitting themselves to what the schools are pleased to send them. By closing their doors against all applicants whom they do not really deem adequately prepared, they must compel the schools, either to take down from their portals the inscription "fitting school," or to mend their ways and furnish their pupils the kind and the amount of instruction they ought. A University that meekly submits to travel on whatever roads some hundreds of schools, which all more or less follow their own notions, happen to think good enough, never can be a University except in name. No institution has a moral right to the proud name of University that does not, consciously and determinately, do all that is in its power to direct its educational policy solely by what the civilisation of the age and the true interests of the nation require.

I wish the old maxim *ultra posse nemo obligatur* did not compel me to say "to do all that is in its power," for I am but too well aware how deplorably little that is in many cases. State Universities are subject to another will, and this other will is apt to have very much its own notions as to how much a University may be allowed to cost, and to determine the standard of the University entirely by the local standard of schools. Other Universities, though legally their own masters, are practically restrained as much or even more by implacable facts. No University can entirely dispense with students, and the endowment of more than one University forbids its making light of the number of students it can secure. Being to some extent dependent upon the students for their maintenance, they cannot afford to be very fastidious in regard to the standard of schools they try to enlist into their constituency. But there is also a goodly number of Universities whose position is in absolutely every

respect so strong that they can enter the lists without any risk whatever to themselves. Whether they stop growing for a while or even decline in numbers for some years does not affect their future in the least. They are so much in quest by students that the fitting schools are sure to make haste to meet their requirements, if these rise above their curriculum. To move on in wild leaps would, of course, be foolish. But so long as these Universities do not do that they never need to look backward in their onward march; their whole constituency of schools must follow close upon their heels, because they cannot afford to bolt and drop out. The more the leading Universities proceed upon a concerted plan, the larger the circle would grow, within which their joint pressure would be irresistible: the strength of each would be doubled by pressing on, shoulder to shoulder with the others, on the same lines. At the same time it will make it correspondingly easier for the weaker ones to follow in their wake. How could it fail to make an impression upon those on whom they depend, if they can back their pleas by urging the practical unanimity of all the foremost institutions of the country as to the right course to take? The more the leading Universities are united, not only as to the scope and method of their own work, but also as to what is to be considered the proper preparation for University work, the more will deviations from the rules laid down by them come to imply to public opinion inferiority of standard; and if there is a whip under which American communities smart, it is this. As to this would be added the missionary influences of the alumni sent from the leading Universities into all parts of the republic, it would be strange indeed, if the idea were not constantly to spread and to cast deeper root, that to adequately provide for the educational needs of the country, it is necessary consciously to create and systematically to foster a tendency, by the free action of public opinion, more and more to harmonise education, in developing it everywhere and in all its ramifications into a thoroughly organic structure.

I am prepared to hear the opinions I have ventured to advance strenuously contested and, perhaps, even mercilessly ridiculed by many. The open antagonists, however, cause me but little uneasiness. I fear only one thing, i. e. that those who more or less endorse

my criticisms and agree with me as to what is desirable, will be induced by the arduousness of the work to persuade themselves that it is impossible to bring about such a reform. To them I should say: Where there is a will, there is a way, and the American people *must* be brought to will this reform, because every year a portentous word is becoming more true and of greater import: "the age of perils is past, but the age of difficulties has set it."

H. VON HOLST.

MEANING AND METAPHOR.

PROFESSOR HUXLEY supposes* "that so long as the human mind exists, it will not escape its deep-seated instinct to personify its intellectual conceptions." He finds that "the science of the present day is as full of this particular form of intellectual shadow-worship as is the nescience of ignorant ages." The difference he sees is "that the philosopher who is worthy of the name knows that his personified hypotheses, such as law, and force, and ether, and the like, are merely useful symbols, while the ignorant and the careless take them for adequate expressions of reality." He then goes on to warn us against dealing with symbols as though they were "real existences."

Few indeed are free from reproach in this matter, so far as reproach is deserved at all in the general unconsciousness of what constitutes the danger. Few see the question to be vital or the danger to be urgent; and even those who do are apt to deny that the search for a remedy can be a crusade worth attempting; the very idea seems Utopian or pedantic. On the one hand, teachers as a rule do not take their own analogies and metaphors seriously. Both the literary and scientific, as well as the philosophic and historical instinct tell against their doing so. In their eyes figures have either faded into indifferent abstractions, or they are obviously pictorial and merely rhetorical. But the average reader is apt to take them at the foot of the letter. He is usually unaware both of the extent to which he literalises and of the curious inconsistencies which his

* *The Nineteenth Century*, April, 1886. (Reprinted in *Essays on Controverted Questions.*)

literalising involves. So he makes his inferences with a light heart, and wonders, perhaps, at the resulting confusion without suspecting its true cause.

Would that the real state of the case and its practical consequences could be pressed home to all with such force, that whatever be our line of work or thought or expression we should strive in earnest to mend matters. At least, we might begin by learning better what part symbolism plays in the rituals of expression, and ask ourselves what else is language itself but symbolism, and what it symbolises. We should then examine anew the relations of the "symbolic" to the "real"; of image, figure, metaphor, to what we call literal or actual. For this concerns us all. Imagery runs in and out, so to speak, from the symbolic to the real world and back again. As matters stand, we never know where we are because we know so little where our phrases or our words are; indeed, perhaps they and we are "neither here nor there"! Or, if we do know where we are, we cannot be sure that our hearer or reader knows where he is. He, too, is probably "neither here nor there." He often praises or agrees with us in the wrong place or the wrong manner. That is worse than being complained of or differed from; it is difficult to repudiate approval. Nor can we take refuge in lucidity and fancy that the clear must be the true. In the long run and in the cases which *signify* most, there is no escape through merely lucid style or method. The "luminous" speaker or writer, the "forcible" orator or essayist, the moment he tries to convey to the public mind a thought which is really new, will find himself hampered by his very clearness itself. His ideas are controverted on assumptions not really his; or he himself is misled in subtle ways by what he assumes in others.

Thus, by an instructive paradox, the clearest writer is often the most controversial; and he wonders at our perverseness as, while we admire his power and his "style," we wonder at the perverseness in him. We possibly agree with him in ways we do not suspect; he possibly agrees with us in senses he ignores. Such a writer may pride himself on a chary use of metaphor, or on a carefully sharp distinction between "image" and "thing" or "object." But

he is liable to forget the danger dogging him even here. One is tempted to say that there is only one term more figurative as well as more ambiguous than "metaphorical," and that is "literal." Most certainly much that is called "literal" is tinged with the figurative in varying degrees, not always easy to distinguish, even with the help of context. The word "literal" itself is indeed a case in point. It has rarely, if ever, any reference to writing.

The question is, whether this state of things is quite so inevitable as most of us seem to think. Certainly, so long as we are content to live in the fool's paradise of supposing that only the perverse, the prejudiced, the stupid, or the ignorant can possibly mistake our meaning, and that our misreadings of others are simply due to their "obscurity," or "quibbling," or literary incapacity, we shall ourselves contribute to the hopelessness of the situation. But this is a subject which cannot be dealt with in an incidental way; it is rather a hope for the future, that one of the most practically serviceable of subjects—that of Meaning, its conditions and its changes—shall be seriously taken up. Then, indeed, we may get back to the first of all questions, and that which is most pregnant of helpful answers; that which needs asking more than any other if good work is to be done in this day of universal "unsettlement":—What do we really mean? On all sides dead calms are stirred and ruffled, dead levels upheaved or depressed; nothing (happily) can hope to escape the wave of quickening force. So before long we may well be asking this question in good earnest; and when we do we can but be the better, even if we must needs submit in some cases where we may have been prematurely positive, to be content (for the moment) with the answer: We do not really know.

The fact is, that we have been postulating an absolute Plain Meaning to be thought of, as it were, in capital letters. We have been virtually assuming that our hearers and readers all share the same mental background and atmosphere. We have practically supposed that they all look through the same inferential eyes, that their attention waxes and wanes at the same points, that their associations, their halos of memory and circumstance, their congenital

tendencies to symbolise or picture, are all on one pattern. Verily, we need a "Critique of Plain Meaning"!

Again we *quote* on the same assumption. Unless the language of our author is obviously archaic; unless his allusions unmistakably betray a different life-context, a different social "milieu," in short, a different mental world, we claim him or we repudiate him on the same principle. We take his words, we take his phrases, we fill them out with the same content as our own, we make him mean precisely what we ourselves mean. And be it noted that it is always what we mean *now*. That this in any way varies from what we meant at some time when, e. g., our attention was differently focussed, rarely enters our heads.

We shall, I suppose, admit that until lately there was one very good reason for this state of things. Only the exceptional mind (if any); only the mind which could not make itself fully understood by its contemporaries, and would risk being reckoned crazy or criminal if it spoke "plainly," had any suspicion that this way of looking at things was being gradually invalidated by the general extension of the critical domain. The history of language, its relation to thought; the scope of expression and representation, the function of the figurative and symbolic; the growth of all means of mental communion from the simplest rudiments of gesture or cry to the highest point of intellectual complexity,—all this was either ignored or taken for granted on radically insecure bases.

Again, while the underlying conditions of language must be looked for in the domain of psycho-physics, that science had not yet come into existence. Even now it is but feeling its way and putting forth tentative hypotheses, warning us, as it does, so that they are liable to be constantly modified and occasionally revolutionised. And what does it realise, first and foremost? That our difficulties on the very threshold of the inquiry are, as usual, largely those of language. On all sides we have to use, as best we may, modes of expression that inevitably convey ambiguous meanings even to the thoughtful, even to the trained mind, which cannot but carry with them a background of outgrown or disproved premises, vitiating more or less every conclusion that we draw from them. The very

phrases which are our only shorthand for the vast oratory of nature and experience betray us in the using. We have taken them as though they were like numerals invariable in meaning, thus supposing them subject to a permanent uniformity. We have taken them as though they were without a history, merely fortuitous labels or symbols of unanimous consent; the accepted sense, we think, being easily ascertainable, always persistent, and wholly sufficient for practical purposes. In any case we strangely assume that we may safely play upon all the chords of imagery, reserving without difficulty for serious use a body of terms which are direct expressions of "fact."

But the suggestion now made is that this is precisely one of the most dangerous of presuppositions. It is not the man who has mystified himself, or who wishes to mystify others; it is not the man who confounds the reality of the logical with that of the actual; it is not the man who takes emotion for proof and notion for fact; it is none of these, but the man who is clear on such points and sees that they must be drawn out into clues and followed up to the uttermost, if we would know where we are—who is beginning to see that the paramount need of the moment is the "torpedo-shock" of the question, What do we really mean? He knows that the off-hand vagueness and ready-made confusion, which too often from sheer ignorance usurp the name of common-sense, are in the long run its most deadly enemies.

We may look forward then with a new hope to the rise of a systematic inquiry on the subject of meaning and its changes. This would entail the much-needed work of classifying metaphor, and might even be found to point to the existence of a third value, neither wholly literal, nor wholly figurative, as that of a large proportion of ordinary expression. From this and like causes, in this age of rapid changes due mainly to scientific conquest, we can all readily put to each other questions to which either a "yes" or a "no" must be equally misleading. And men of science have specially realised this, since many a time they have been unjustly credited with evasion, or with untenable or immoral views, because they either answered to a "plain question": "In one sense, yes; in

another, no," or else gave an answer which could not fail to be misunderstood by a mind which was governed by unconscious survivals. So far as we are in touch with modern culture, we no longer mean what we must have meant in the days before Copernicus, when we say, for instance, "the sun rises." When we speak of infection, we no longer mean what we used to mean before microbes had been heard of. When we talk of "heat," we no longer mean what we used to mean even fifty years ago. And when a man says that he believes in the sun, the planets, the cosmos, in the heavens and the earth, in mind and matter, in soul and body, in spirit and flesh, he cannot, if he would, mean just what his forefathers meant, or indeed anything at all absolutely and finally. Whether we will or no, the meaning of such terms is changing on our very tongues, and ever swaying between the extremes which we call literal and metaphorical; "heaven," e. g., ranging in value from sky to human destiny; "earth," from soil to the visible Home of Man. We may appeal, and are right to appeal to "hard, dry" facts; but we perforce put something out of ourselves even into these. They become "facts" under the quickening touch of "mind," while that emerges from a dim world of prepossession, bequeathing us many a primitive legacy from pre-intelligent sentience, and perhaps from little-suspected sources lying yet further back. For instance, primitive terror in its "superstitious" forms tended to represent man as inferior to and dependent on powers of some sort;—and this was true to natural order in the fact that his very world was not self-centred and was dependent for its best boons upon a greater than itself. As language advanced, he began quite naturally to express his meaning in "appropriate metaphors"; to use, e. g., the figures of light and then of sight to describe what he had, as we now say, "in his mind," or what sense-messages, as we now say, had "put into his head." For "something told him" that light, as it had been the first pleasure, was also the great means of life.* And he "saw," in however gro-

* "Light affects the new-born infant at an early stage, although in this as in other respects individual differences immediately assert themselves. The child seems to take pleasure in an excitation of light and tries (even on the second day

tesque a guise, the unbroken continuity of the organic and the inorganic, and perhaps even more clearly than most of us yet do, that of so-called "matter" and so-called "mind." Perhaps in some cases, therefore, he chose his imagery better than (after long ages of dualism carried to the splitting-point) we generally do now.

He knew again that the senses after all, stern masters though they were while life was so hard to live, had very narrow limits; and that the world was in some sense fuller and richer of life than it had seemed to be as known directly through them.* And then he wondered,—and began to ask. He was the first Questioner. As Prof. Max Müller says,† "the greater the savagery, the dullness, the stupidity with which *Homo sapiens* began, the greater the marvel at what must have been from the first, though undeveloped, in him, and made him in the end what we find him to be in the men of light and leading of our own age." The mere fact of the question is the riddle to be solved. For certainly the beasts had not taught him either to wonder or to ask. And not merely insatiable questioning but something more here rises to challenge our attention and to demand reflection. Man is the first critic because he is the first idealist; the first to be discontented, to protest, to see life as a "ravelled end,"

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after birth) to turn towards it in order to retain it." (*Outlines of Psychology*, H. Höffding, p. 4.)

"Under the influence of light the conversion of inorganic matter into more complex organic matter takes place, more particularly in the green cells of plants." (*Ibid.*, p. 315.)

"It is certainly necessary to look further back than the visual sensations to understand the great influence of light on all creatures that have sensuous perception. . . . Light is thus one of the most elementary conditions of life." (*Ibid.*, p. 229.)

* It must be borne in mind that I am using psychological terms in a merely general sense. Among many examples of such use I may quote Sachs (*Physiology of Plants*, p. 200) and F. Darwin (*Address to Biological Section*, Brit. Assoc., August 1891), who speaks of the plant as "perceiving" external change, as "recognising" the vertical line, "knowing" where the centre of the earth is, "translating" stimulus, etc. See also Darwin's *Forms of Flowers*, p. 90.

Again Prof. M. Foster uses the word "will" in the same general (rather than metaphorical) sense. (*Text Book of Phys.*, Part 3, pp. 1059, 1062, 1063.) Modes of reaction are thus verbally linked with consciousness, and we must remember that all our terms for the "mental" belong first to the "physical," and that many are reciprocally used in the two spheres.

† *Natural Religion*, p. 243.

as something which is incomplete and speaks of something more. Surely in any case the step of all steps, the deepest yet the narrowest line to cross is the step from something noticed or found, from something which happens or appears, from something which somehow affects us, excites us, to its significance.

Of course in one sense it is impossible to fix any definite moment as that of the advent of this "significance." Animals interpret each others' aspect and gestures, often indeed with a subtle precision which to some extent we have lost. But interpretation in the intellectual sense becomes, from our present point of view, that which makes us really human. Our progress, our ascent, is mainly marked in this. The root-question to ask in gauging levels of humanity is, how much can a given man interpret or translate, of a world that teems with meaning? How much can he truly classify and relate, how much can he rightly infer and conclude, how much can he account for, explain, and fruitfully apply? For after all, results must be our tests. Claims and credentials are nothing, unless they can show this warrant; whereas truth which can use all facts alike is the very means of survival. Man begins by doing, by acting out impulse; then he learns to "think" little by little, observing, questioning, pondering, testing his way onward and upward. And throughout his patient, often painful journey, he is himself perpetually challenged. Nature's stimulating appeals rain upon him ceaselessly from every side; she orders him to master all her meanings. He responds:—at first again, "blindly," but ever rising to higher grades of answer. Both deficiency and error are no doubt more or less present in all mental response to actual fact—that is, in all experience. But the essence of sanity from the first lies in corrective power. Everywhere there is either absence of notice, absence of response, or there is experimental activity (broadly speaking) corrected at once; automatically or by the combined effect of the related organic activities. For instance, in health, if in using the hand, one finger accidentally goes astray, the coördinating muscles promptly recall it to a "sense of duty." We know how the same rule works in speech and writing. Therefore, unless "voluntary"

and "capricious" (or "willing" and "wilful") are synonyms, the advent of volition ought not to mean the abrogation of this rule.

It is, however, obvious that "natural selection" can only operate in cases where death or sterility is the consequence of failure in adaptation and appropriate reaction, or segregation the consequence of excessive variation. But the point here is, why does not a tendency to correction, thus established, survive automatically in incipient imagination and therefore in language? It seems almost a burlesque of popular notions of "free will" to suppose that the moment the death-penalty is taken off, the new-born intelligence, unique in adapting power, should go astray persistently without let or hindrance. Many now merely formal or even jocular customs still prevailing* testify, as legacies from a remote time of danger needing to be averted, to the strength of tendencies organised during myriads of generations under the pressure of the struggle for life. Why does not this apply to language?

But sight gives us here perhaps the most suggestive lesson; for therein the ascending series seems especially gradual and unbroken. The eye, unlike the other organs of sense is an outgrowth of the very brain itself; "the retina . . . is in reality a part of the brain."† We may well therefore connect its functions specially with the thought of significance; it is the main out-post of our central means of interpretation.

Taking the stages in the evolution of the eye, and using a short summary of these as a convenient means of testing the value of a conspicuous group of metaphors, we find (1) a mere dint; (2) this dint deepening into a pit which (3) gradually narrows. Hitherto we have had only light and darkness; now we have an image, though but a dim one. (4) The pit is closed by a transparent membrane; this is protection, not obstacle. (5) The lens is formed by deposit of cuticle. Gain; increased distinctness and increased brightness. The lens can focus a larger pencil of rays from each part of the ob-

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* See Dr. Tylor's *Primitive Culture*, Vol. I, pp. 74–121; *Ibid*, Vol. II, pp. 297–298, 404–428.

† Dr. M. Foster's *Text-Book of Physiology*, Part 4, p. 1142.

ject to each part of the retina (corresponding point). Finally, iris and eyelid protect the perfected eye more completely, and enable it both to bear more light and to discern more detail.

If mental development were in any way comparable to this physiological development, we should expect to find (1) something which would naturally be described as a vague or dim "impression"; gradually deepening, becoming more distinctly localised as the stimulus became more definitely "impressive." (2) We should begin to find "reality" and the "unreal"; "fact" and "fancy"; "truth" and "falsehood"; knowledge and ignorance,—contrasted as "light" and "darkness."* And this is what actually happens.†

(3) Still our mental "impression" would not as yet afford us an image; "imagination" only now comes upon the scene and begins to work (though as yet "dimly") upon the objects which more and more "incisively" "impress" us. (4) Our deep "impression" is closed in one sense from direct contact with the outward; mental vision becomes more delicately differentiated from the emotional "touch," however this may be specialised and intensified. But what secludes this is transparent; it is protection, not obstacle. We rightly speak of mental penetration; of "seeing through" a superficial limit. The mental "lens" is formed from that "continuum" on which the original "impression" was made. The gain now is increased distinctness and brightness. More rays of "light," of reality, of fact, of truth, of knowledge, can now be focussed from each part of a given object (or group of objects) of mental attention and interest; to each part of the responsive "sensitive plate" of the mind. Finally we

* I am of course merely directing attention to the relative aptness of metaphors of mental process familiarly in use in our own language. It is obvious that before any inference could be made from them as to the value of unconscious analogies of imagery, we should have to make appeal to comparative philology and embark on a wide inquiry, for which the English-speaking races must wait for Dr. Murray's epoch-making Dictionary.

† It must be borne in mind that the whole process presupposes the other senses or at least the temperature-sense, the "muscular sense" and that of touch; that is, we should have "felt" simple stimuli "emotionally" before we "saw" things intellectually. And hearing is not now in question, though in that, too, we should find the same character of development, i. e. the same prominence of the protective and discriminative factors.

have, so to speak, increased protective growth. The function of what are called academic culture and scientific method, with their fastidious standards of fitness and accuracy, may perhaps represent something not unlike that of iris and eyelid, enabling the developing mind safely to bear intenser illumination and also to discern more subtle detail.

It must be admitted that so far as it goes this is a significant psychological parable. However slender its right to the position even of a working clue to early stages of mind, it has at least better credentials than many accepted analogies can claim. And throughout its course what most "impresses" itself upon one's mind is the steady maintenance of invariable reaction to excitation, and of protection from unfavorable stimulus.

"Mind," as Mr. Shadworth Hodgson tells us,* "is a fiction of the fancy." Of course this is open to the retort that so is fancy a fiction of the mind, or fiction a fancy of the mind.

Psychology is full of these see-saws of paradox, depending on vicissitudes of linguistic usage or context. But mind is indeed a fiction of the fancy when we endow it with a fanciful freedom from all ties with what we call physical reality. For this, however plainly we may recognise its genesis in our own sequences of sense-impression, does practically through them rule us with an undeviating severity which neither fiction nor fancy can tamper with. Therefore, if we think it absurd to suppose that there may possibly be an undiscovered vein of authentic and really indicative symbol or metaphor running through the arbitrary meshes of fanciful custom or mythical term, we are in fact implying that all clues from the original interactions of physical energy were entirely lost when what we call "mind" issued first in language. But at all events we may be sure that links between the "physical" and the "psychical" are everywhere drawing closer and emerging clearer, however buried as yet in a mass of the fantastic or the arbitrary.

It will probably be objected that we can never hope to find these. No doubt such an attempt must mean the patient work of

* *Brain*, June, 1891. P. 13.

many lifetimes, and at best we could not hope to lay bare the ultimate point of "origin." But yet it seems worth trying. For after all, even the results which may appear so scanty in the tracing back of language, are already rich far beyond what could have been hoped for a few generations back. And if it were once realised that such a line of work might have practical and far-reaching issues; if we really saw that thus some barren disputes and speculations might cease to bar the way or to waste some precious energies, we should be more than rewarded. In his "Dialogues of Plato"* Professor Jowett warned us twenty years ago of our linguistic dangers, repeating his warning with greater emphasis and in fresh forms in the admirable essays added in the edition just published. He urges that the "greatest lesson which the philosophical analysis of language teaches us is, that we should be above language, making words our servants and not allowing them to be our masters." "Words," he tells us, "appear to be isolated but they are really the parts of an organism which is always being reproduced. They are refined by civilisation, harmonised by poetry, emphasised by literature, technically applied in philosophy and art; they are used as symbols on the border-ground of human knowledge; they receive a fresh impress from individual genius, and come with a new force and association to every lively-minded person. They are fixed by the simultaneous utterance of millions and yet are always imperceptibly changing:—not the inventors of language, but writing and speaking, and particularly great writers, or works which pass into the hearts of nations, Homer, Shakespeare, Dante, the German or English Bible, Kant and Hegel, are the makers of them in later ages. They carry with them the faded recollection of their own past history; the use of a word in a striking and familiar passage, gives a complexion to its use everywhere else, and the new use of an old and familiar phrase has also a peculiar power over us." Then he reminds us of what we too often forget; that "language is an aspect of man, of nature, and of nations, the transfiguration of the world in thought, the meeting-point of the physical and mental sciences, and also the

* Vol. I, pp. 235–286, 293.

mirror in which they are reflected, an effect and partly a cause of our common humanity, present at every moment to the individual and yet having a sort of eternal or universal nature."*

Nowadays, when we feel most scathingly superior, we often announce that we fail to see and have yet to learn something which, bringing us, it may be, a really fresh idea, unpleasantly stirs misgiving. Let us go on with our greeting, meaning it in good earnest. For when we honestly and without reservation consent to learn and succeed in seeing some things now waiting for our study we may find more than we look for, within reach. After all it may be that

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* The following, among many pregnant passages between which it is difficult to choose, may be further quoted:

"The famous dispute between Nominalists and Realists would never have been heard of, if, instead of transferring the Platonic ideas into a crude Latin phraseology, the spirit of Plato had been truly understood and appreciated. Upon the term substance at least two celebrated theological controversies appear to hinge, which would not have existed, or at least not in their present form, if we had 'interrogated' the word substance, as Plato has the notions of Unity and Being. Those weeds of philosophy have struck their roots deep into the soil, and are always tending to reappear, sometimes in new-fangled forms; while similar words, such as development, evolution, law, and the like, are constantly put in the place of facts, even by writers who profess to base truth entirely upon fact. In an unmetaphysical age there is probably more metaphysics in the common sense (i. e. more *a priori* assumption) than in any other, because there is more complete unconsciousness that we are resting on our own ideas, while we please ourselves with the conviction that we are resting on facts. We do not consider how much metaphysics are required to place us above metaphysics, or how difficult it is to prevent the forms of expression which are ready made for our use from outrunning actual observation and experiment." (Vol. IV, p. 39–40.)

"To have the true use of words we must compare them with things; in using them we acknowledge that they seldom give a perfect representation of our meaning. In like manner when we interrogate our ideas we find that we are not using them always in the sense which we supposed. (*Ibid.*, p. 41.)

"Many erroneous conceptions of the mind derived from former philosophies have found their way into language, and we with difficulty disengage ourselves from them. Mere figures of speech have unconsciously influenced the minds of great thinkers. Also there are some distinctions, as, for example, that of the will and of reason, and of the moral and intellectual faculties, which are carried further than is justified by experience. Any separation of things which we cannot see or exactly define, though it may be necessary, is a fertile source of error. The division of the mind into faculties or powers or virtues is too deeply rooted in language to be got rid of, but it gives a false impression. For if we reflect on ourselves we see that all our faculties easily pass into one another, and are bound together in a single mind or consciousness; but this mental unity is apt to be concealed from us by the distinctions of language." (*Ibid.*, p. 155.)

we have really failed to see and have really yet to learn the part that meaning—whether of language or of conduct—and its change or variations (successive or simultaneous) have had throughout the mental history of man. It may be that while the ordinary modern metaphor like the ordinary modern analogy is a mere rhetorical device, some few images may be found to hail from an altogether deeper and more authentic source. Many, however ancient, are not of course any the more valid for their antiquity. On the contrary it is obvious that such a figure for instance as "foundation" or "basis" to express an ultimate necessity, is a survival from days in which the earth was supposed to require and to possess such fixed and immutable base, while the analogies, e. g. between the human and the inorganic orders are now reversed. We import the idea of mechanism and invariable sequence into the former instead of exporting conscious intention into the latter; we level down where our forefathers levelled up. And we have to beware of the subtle atmosphere of fallacy thus introduced.

But on the other hand it is conceivable that some may be found to belong to that as yet mysterious energy on which natural selection plays and of which variation is the outcome or the sign. What we find in language may thus be, as it were, not merely the "scarred and weather-worn" remnant of geogenic strata but sometimes the meteorite, the calcined fragment of earlier worlds of correspondence, ultra-earthly, cosmical. We have no right to do more than ask and seek and knock at the gates of fact in such a matter as this. But until that has been done; until at least we have tried the experiment; have looked for grades of validity in metaphor and analogy in the light of modern science, and still more, have recognised clearly the powerful though hidden effects upon us of organised mental picture brought in surreptitiously with verbal imagery, or by comparison; we cannot know whether such an effort is worth while or no, or what harvest it may yield. For after all, whether we like it or no, we *are* heliocentric; the world and all that is in it is cosmically generated. As far as science—and experience—are concerned, anything which says "I don't admit that origin; I claim to have produced myself or to have been originated by and on the

earth in a final sense," must make good its geocentric or self-creating pretensions with overwhelming cogency and rigorous proof. We appeal to the "light" of science, of reason, of experience, against the "darkness" of superstition, myth, and mysticism. And we are thus appealing not to the supersensuous or supernatural but to the ultra-satellitic. Not only beyond the earth and touch but beyond the atmosphere and hearing is the home of the light that lightens our small world, calling forth in us the answer of sight. And the manifold revelations through this sense—in its mental as well as bodily character—press upon us, with greater and greater insistence, the wealth of our relations with the universe.

In any case, *meaning*—in the widest sense of the word—is the only value of whatever "fact" presents itself to us. Without this, to observe and record appearances or occurrences would become a worse than wasteful task. Significance is the one value of all that consciousness brings, or that intelligence deals with; the one value of life itself. But perhaps for this very reason we have taken it too much for granted. It may need a more definite place in psychological inquiries. It may have unsuspected bearings.

When we have realised better what manner of gift this is, we may find answers of which we have prematurely despaired; answers coming not from the "mystical" point of the horizon of experience, but rather from the neural. And let us beware here of repeating the pre-scientific error of postulating, for figurative purposes, a flat earth on which whatever lies beyond "horizons" never meets! But, it may be said, why not? Why should it signify? Why, but because Man is the one not merely who thinks, or speaks, or writes, or looks upwards, but the one who *means*, the one who *is* the meaning of much, and makes the meaning of all; the one who will not tolerate the unmeaning anywhere in experience. Nothing remains but that he should interpret rightly; that he should apprehend nature and experience in their true sense. It is the glory of science that she puts this aim in the forefront of her labors. She tells us that nothing can be done without assumption and hypothesis as to the meaning of things. But that significance belongs to the very spring to which we owe her dauntless energy and her accumulating triumphs.

Why should it signify? The very term answers us. To "signify" is the one test of the important. The significant is alone worth notice. We inherit a mode of thinking which we are at last becoming able to criticise in the light of knowledge gained by observation and experiment. But if we persist in using, without warning to hearer or reader, imagery which has no longer either sense or relevance, or which tends to call up a false mental picture or to perpetuate an else decaying error, we shall to that extent forfeit the very gifts which science brings us, and must not complain of the obstinate persistence of ideas which needlessly divide us. At least, let us try to realise more clearly what we are losing in this way. The danger even thus must needs be lessened; detected bogies become powerless for mischief; but we need not leave their ancient home empty, swept, and garnished; stores of verified analogy are waiting to replace them. The figurative must not indeed be pressed, still less literalised. But we may see that it conveys a true, rather than a false impression; and harmonises with, instead of contradicting that which we most surely know.*

It may be said in a true sense that the function of the hero, the saint, the poet, is to bring the world to *life*. But the function of the devoted servant of science, the critical scholar, the true philosopher, is to bring the world to *truth*, in a sense only now becoming possible. Through the last discipline alone, in its most thorough applications, can we hope fully to master the scope of all significance and the laws of all its workings. Then, indeed, we may further hope to read with a fresh eye the Significance of Life.

VICTORIA WELBY.

* I would gladly forward to any reader interested in a question of such practical bearings, a small collection of *Witnesses to Ambiguity* gathered from representative sources, and a pamphlet which was circulated at the International Congress of Experimental Psychology, held in London, August, 1892, giving examples of the mischievous confusions suggested by the use, even among writers of the first rank, of the metaphor, *Inner and Outer*. Prof. H. Sidgwick, the president, in his opening address, expressed the opinion that very important work of this kind remained to be done, and added, "I have much sympathy with the view urged in a pamphlet that I have received for distribution among members of the Congress, which illustrates forcibly the confusion caused by one established antithesis of terms. Professor Sully and others have expressed themselves strongly in the same sense.

REPLY TO THE NECESSITARIANS.

REJOINDER TO DR. CARUS.

§ 1. In *The Monist* for January, 1891, and in the number for April, 1892, I attacked the doctrine that every event is precisely determined by law. Like everybody else, I admit that there is regularity: I go further; I maintain the existence of law as something *real and general.* But I hold there is no reason to think that there are general formulæ to which the phenomena of nature *always* conform, or to which they *precisely* conform. At the end of my second paper, the partisans of the doctrine of necessity were courteously challenged and besought to attempt to answer my arguments. This, so far as I can learn, Dr. Carus alone, in *The Monist* of July and October, 1892, has publicly vouchsafed to do. For this I owe him my particular thanks and a careful rejoinder.

§ 2. I number the paragraphs of his papers consecutively. The following index shows the pages on which those paragraphs commence, and the numbered sections of this rejoinder in which they are noticed.

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§ 3. Dr. Carus's philosophy is hard to understand. Some phrases which he frequently uses lead the reader to imagine that he is listening to an old-fashioned Kōnigsberg Kantian. What, then, is our surprise when we find (¶ 14) that he sneers at the Kantian, Sir William Hamilton (whom he calls Mr. Hamilton) as having "no adequate conception of the *a priori*." In his "Ursache, Grund und Zweck" (1883), an admirably clear and systematic exposition of much of his thought, he takes a Schleiermacherian view of the *a priori*. He admits it to be founded in the universal conditions of cognition; but he thinks it is among the objective rather than the subjective conditions. This is an opinion to which Hamilton is also at times inclined. It is a weak conception, unless the whole distinction between the inward and the outward world be reformed in

the light of agapastic and synechistic ontology. For to deny that the *a priori* is subjective is to remove its essential character; and to make it both subjective and objective (otherwise than in the sense in which Kant himself makes it objective) is uncalled for, and is cut off by Ockham's razor. But when synechism has united the two worlds, this view gains new life.

Another thing which has astonished me is Dr. Carus's extravagant laudation (¶ 17) of Venn's highly enlightened and remarkably bright-thinking, yet blundering little book, "The Logic of Chance."* This is the way he speaks of it: "This admirable work, we will make bold to say, marks a new epoch in the study of logic." He adds that it "paves the way which Mr. Peirce has actually followed." But the question of the nature of probability had long before that publication engaged the attention of some of the most powerful intellects in England; and my opinion concerning it was fully made up before I saw the book. I do not think I learned anything from that except a classification of the philosophies of probability. However, after all his eulogy, Dr. Carus only uses the book to quote from it Mill's rewording of Kant's definition of causation, which he would better have quoted direct.

Let me say, not to Dr. Carus, but to the younger generation of readers, that if they imagine that Hamilton, because he is antiquated, is not worth reading, they are much mistaken. The Scotistic elements of his philosophy, and his method in the notes on Reid are especially worthy of attention. As for Mill, though his philosophy was not profound, it is, at least in his "Examination of Hamilton," admirably set forth. Whoever wishes to appeal to the American

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* J. S. Mill had in the first edition of his *Logic* decisively taken an objective conception of chance and probability; but in his second edition he had become puzzled and had retracted, leaving that chapter, and with it his whole logic, a melancholy wreck, over which the qualified reader sighs, "And this once seemed intelligible!" Venn in the first edition of his book set forth the same objective conception with great clearness, and for that he was entitled to high praise, notwithstanding his manifest inadequacy to the problems treated. But in his second edition, he too has fallen away from his first and correct view, and has adopted a theory which I shall some day show to be untenable. Venn's whole method in logic, as well as his system, is in my opinion of the weakest.

philosophical mind needs to be quite familiar with the writings of these two men.

Dr. Carus himself accepts all that I hold for erroneous in Kant's definition of causation as universal and necessary sequence. Mill merely substitutes the exacter words *invariable* for "universal," and *unconditional* for "necessary."* In giving his form of the definition, Mill shows why it is not applicable to the sequence of day and night, namely, that that is not necessary. Yet Dr. Carus writes (¶ 18) of this very same sequence as if it came under Mill's definition !†

Again, why should he make it "the immortal merit of the great Scotchman" (¶ 22), that is, of Hume, that he admitted the truth of Leibniz's principle?

The famed puzzle of causation is peculiarly understood by Dr. Carus. The difficulties which the perusal of Hume suggested to the mind of Kant,‡ were such as belonged to all categories, or general conceptions of the understanding. The precritical Kant inherited a very decided nominalism from Leibniz and Wolf; and the puzzle for him was simply the usual difficulty that plagues nominalism when it finds itself confronted with a reality which has an element of generality. Necessity is, I need hardly say, but a particular variety of universality. But Dr. Carus (¶ 24) passes over this, to dwell upon an entirely different objection to causation, namely, that it seems to be a creation out of nothing, and a miracle.

I find myself equally at cross-purposes with him, when in ¶¶ 71–77, he speaks of the prevalent views of logicians concerning *comprehension*. This word, in logic, measures the amount of predicates or marks attached to a conception; but Dr. Carus's criticisms seem to be based upon the idea that by comprehension is meant

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* Mill often did good service in substituting precise terms for ambiguous ones; as when in speaking of mathematical conclusions he prefers to say they are legitimate deductions rather than that they are necessary.

† In his *Ursache, Grund und Zweck*, Dr. Carus alludes to this passage. But he prefers the treatment of the question by Reid, whom he calls Mill's opponent (*Gegner*).

‡ It is of comparatively little consequence what Hume really meant. The main interest is in what Kant thought he meant.

logical breadth, or the amount of subjects to which the conception is applicable.

I am simply gravelled by his remarks (¶ 95) concerning sundry English words.

No more do I know what to make of his praise (¶ 123) of the German translation of a French phrase used in the theory of functions, meaning *univocally determined.*

§ 4. One habit which goes far to obscure Dr. Carus's meaning is that whenever he finds his opinion at variance with a familiar saying, instead of rejecting that formula, he retains it and changes the meaning. This is calculated to throw the whole discussion into confusion. Thus, nothing is more certain than that the so-called "law of identity," or A is A, was intended to express the fact that every term is predicable of itself. But Dr. Carus, simply because he finds that "meaningless and useless" (¶ 96), thinks himself authorised to confuse the terminology of logic by making this formula, $A = A$, under the same old name, mean that things to which the same name is applicable are for some purpose equivalent.

In like manner, he changes the meaning of the word *freedom* (¶ 165), so that the distinction between those who maintain and those who oppose the freedom of the will may, in words, disappear. It seems scarcely defensible for a thoroughgoing necessitarian, such as he is, to fly the flag of Free Will.

He, also, changes the meaning of *spontaneity* so far that, according to him, "masses gravitate spontaneously" (¶ 191), and so pretends that his doctrine does not suppress the spontaneity of nature!

§ 5. There are other questions of terminology in which I am unable to agree with Dr. Carus. Thus, when I define necessitarianism as "the theory that the will is subject to the general mechanical law of cause and effect," Dr. Carus (¶ 139) wishes to delete "mechanical." But the result would be to define a doctrine to which the advocates of free will would generally subscribe, as readily as their opponents. In order properly to limit the definition, it is quite requisite to exclude "free causation." By "mechanical" causation, I mean a causation entirely determinative, like that of dynamics, but not necessarily operating upon matter.

Dr. Carus mentions (¶ 84) that there are several different ideas to which the term necessity is applied. It seems to me that what lies at the bottom of all of them is the experience of reaction against one's will. In the simplest form, this gives the sense of reality. Dr. Carus himself admits (¶ 46) that reality involves the idea of inevitable fate. Yet philosophical necessity is a special case of universality. But the universality, or better, the generality, of a pure form involves no necessity. It is only when the form is materialised that the distinction between necessity and freedom makes itself plain. These ideas are, therefore, as it seems to me, of a mixed nature. Dr. Carus (¶¶ 91–94) insists that by the necessary, he wishes to be understood to mean in all cases the *inevitable*. This is the idea of *fate*, and is not the conception which determinists usually attach to the term necessity. Yet he does not appear to be quite consistent. At one time (¶ 88), he carefully distinguishes necessity from fate. At another time (¶ 163), every element of compulsion is to be excluded from the conception of necessity.

§ 6. One important key to Dr. Carus's opinions is the recognition of the fact that, like many other philosophers, he is a nominalist tinctured with realistic opinions.

He says (¶ 103), that "there is no need of discussing the truism that, properly speaking, there is no absolute sameness." Now, upon the nominalistic theory, there is not only no absolute or numerical identity, but there are not even any real agreements or likenesses between individuals; for likeness consists merely in the calling of several individuals by one name, or (in some sytems) in their exciting one idea. On the other hand, upon the realistic theory, the fact that identity is a relation of reason does not in the least prevent it from being real. On that theory, it is real unless it is *false* that anything is itself. Thus, upon either theory, identity is just as real as similarity. But Dr. Carus, being a nominalist leaning toward realism, is inclined to make dynamical relations real, and second-intentional ones unreal. This opinion, I think, is a transitional one.

The declaration (¶ 198) that "natural laws are simply a description of nature as nature is," and that "the facts of nature ex-

press the character of nature," are nominalistic. But in another place (¶¶ 107–116), he says distinctly that uniformities are real.

He says (¶ 70), "Mr. Peirce attempts to explain natural laws as if they were concrete and *single facts.*" This is eminently nominalistic. The nominalist alone makes this sharp distinction between the abstract and the concrete,* which must not be confounded with Hegel's distinction for which the same words are used. The nominalist alone falls into the absurdity of talking of "single facts," or *individual generals.* Yet Dr. Carus says (¶ 68) that natural laws describe the facts of nature *sub specie aeternitatis.* Now I understand Spinoza to be a realist. In ¶ 117 he considers it "settled" "that there are samenesses." This is realistic. But in ¶ 120, he holds "the whole business of science to be to systematise the samenesses of experience," which is nominalistic.

§ 7. Dr. Carus seems to be in some doubt as to how far evolutionism ought to be carried. In ¶¶ 48–51, he seems to side with my contention that it should be thoroughgoing. In ¶ 116, he makes intellect an evolution from feeling. Yet he is sometimes (¶ 125) "inclined" to say the world never was a chaos; he sometimes (¶ 61) thinks it weak to suppose that real chance begets order; and he sometimes (¶ 68) goes so far as to pronounce eternity to be the *conditio sine qua non* of natural law.

§ 8. Every reader of *The Monist* knows that our good editor's great word is "formal law." The clearest statement he has ever made of this doctrine I find in the following two sentences (¶ 127):

"The *a priori* systems of thought are . . . . constructions raised out of the recognition of the formal, i. e. relational samenesses that appear in experience All possibilities of a certain class of relations can be exhausted and formulated in theorems."†

This is perspicuous. For example, of pairs, we can easily show that there are but two forms $A:A$ and $A:B$. This proposition,

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* Along with the distinction, I would of course do away with this use of the words *abstract* and *concrete* to which no clear idea can be attached, as far as I can see.

† I cannot but disapprove of this use of the word "construction" to mean a studied theory, because the word is imperatively required in the theory of cognition to denote a mathematical diagram framed according to a general precept.

—theorem if you will,—exhausts the possibilities. If we make believe there is no danger of falling into error in mathematical reasoning,—and one danger, though not, perhaps, a very serious one, *is* eliminated,—then this proposition is absolutely certain. But I will say, at once, that such a proposition is not, in a proper sense, synthetic. It is a mere corollary from the definition of a pair. Moreover, its application to experience, or to possible experience, opens the door to probability, and shuts out absolute necessity and certainty, *in toto*.

Concerning points like this, Dr. Carus, in company with the general body of thinkers, is laboring under a great disadvantage from not understanding the logic of relatives. It is a subject I have been studying for a great many years, and I feel and know that I have an important report that I ought to make upon it. This branch of logic is, however, so abstruse, that I have never been able to find the leisure to translate my conclusions into a form in which their significance would be manifest even to a powerful thinker whose thoughts had not long been turned in that direction. I shall succeed in doing so, whenever I can find myself in a situation where I need think of nothing else for months, and not before. That may not be for thirty years; but I believe it is the intention of providence that it should be. Meantime, I will testify, and the reader can take my testimony for what he thinks it is worth, that all deductive reasoning, except that kind which is so childishly simple that acute minds have doubted whether there was any reasoning there,—I mean non-relative syllogism,—requires an act of choice; because from a given premise, several conclusions,—in some cases an infinite number,—can be drawn. Hence, Dr. Carus is altogether too hasty in his confidence (¶¶ 195, 196) that general thinking machines "are not impossibilities." An act of original and arbitrary determination would be required; and it seems almost evident that no machine could perform such an act except within narrow limits, thought out beforehand and embodied in its construction. More over, positive observation is called for in all inference, even the simplest,—though in deduction it is only observation of an object of imagination. Moreover, a peculiar act which may properly be called

abstraction * is usually required, consisting in seizing evanescent elements of thought and holding them before the mind as "substantive" objects, to borrow a phrase from William James. At the same time, the process I am describing, that is, relative deduction, is perfectly general and demonstrative, and depends upon the truth of the assumed premises, and not, like inductive reasoning, upon the manner in which those premises present themselves.

But the application of the logic of relatives shows that the propositions of arithmetic, which Dr. Carus usually adduces as examples of formal law (¶ 15), are, in fact, only corollaries from definitions. They are certain only as applied to ideal constructions, and in such application, they are merely analytical.

The truth is our ideas about the distinction between analytical and synthetical judgments is much modified by the logic of relatives, and by the logic of probable inference. An analytical proposition is a definition or a proposition *deducible* from definitions; a synthetical proposition is a proposition not analytical. Deduction, or analytical reasoning, is, as I have shown in my "Theory of Probable Reasoning," a reasoning in which the conclusion follows (necessarily, or probably) from the state of things expressed in the premises, in contradistinction to scientific, or synthetical, reasoning, which is a reasoning in which the conclusion follows probably and approximately from the premises, owing to the conditions under which the latter have been observed, or otherwise ascertained. The two classes of reasoning present, besides, some other contrasts that need not be insisted upon in this place. They also present some significant resemblances. Deduction is really a matter of perception and of experimentation, just as induction and hypothetic inference are; only, the perception and experimentation are concerned with imaginary objects instead of with real ones. The operations of perception and of experimentation are subject to error, and therefore it is only in a Pickwickian sense that mathematical reasoning can be said to be perfectly certain. It is so, only under the condition that no error

* I apply this term because it is essentially like the passage from the concrete "virtuous" to the abstract "virtue," or from the concrete "white" (adjective) to the abstract "whiteness," or "white" (substantive).

creeps into it: yet, after all, it is susceptible of attaining a practical certainty. So, for that matter, is scientific reasoning; but not so readily. Again, mathematics brings to light results as truly occult* and unexpected as those of chemistry; only they are results dependent upon the action of reason in the depths of our own consciousness, instead of being dependent, like those of chemistry, upon the action of Cosmical Reason, or Law. Or, stating the matter under another aspect, analytical reasoning depends upon associations of similarity, synthetical reasoning upon associations of contiguity. The logic of relatives, which justifies these assertions, shows accordingly that deductive reasoning is really quite different from what it was supposed by Kant to be; and this explains how it is that he and others have taken various mathematical propositions to be synthetical which in their ideal sense, as propositions of pure mathematics, are in truth only analytical.

Descending from things I can demonstrate to things of which various facts, in the light of those demonstrations, fully persuade me, I will say that in my opinion there are many synthetical propositions which, if not *a priori* in Dr. Carus's sense, are, at least, innate (notwithstanding his frequent denials of this, as in ¶ 15) though he is quite right in saying that their abstract and distinct formulation comes very late (¶ 126). But turn the facts as I will, I cannot see that they afford the slightest reason for thinking that such propositions are ever absolutely universal, exact, or necessary in their truth. On the contrary, the principles of probable inference show this to be impossible.

Dr. Carus adduces the instance of a geometrical proposition, namely, "that two congruent regular tetrahedrons, when put together, will form a hexahedron." (¶ 25.) This, he says, seems to be "a very wonderful thing"; for why should not a larger tetrahedron be formed, just as two heaps of flour make a large heap of flour? Yet, he continues, the probability that the two tetrahedrons

* I can never use this word without thinking of the explanation of it given by Petrus Peregrinus in his *Epistole de Magnete*. He says that physical properties are occult in the sense that they are only brought out by experimentation, and are not to be deduced from admixtures of *hot* and *cold*, *moist* and *dry*.

do always make a hexahedron is 1, "which means certainty" (¶ 27). But as it happens, the proposition, in the form stated is quite erroneous. What is true is this. If two tetrahedra are so placed that one face of each is coincident with one face of the other, while all the other faces are inclined to one another, and if of the 8 faces, the 2 that are coincident are not counted, there remain to be counted $8 - 2 = 6$ faces. But there is nothing more wonderful about this than that $8 - 2 = 6$, which is an easy corollary from definitions. Very few propositions in mathematics that appear "marvellous" will hold water; and those few excite our astonishment only because the real complexity of the conditions are masked in an intuitional presentation of them.

Dr. Carus holds (¶ 15) that formal knowledge is absolutely universal, exact, and necessary. In some cases, as where he says that, given the number of dimensions of space, the entire geometry could be deduced (¶ 35), the boasted infallibility will prove on examination to be downright error. In all other cases, the propositions only relate to ideal constructions, and their applicability to the real world is at the best doubtful, and, as I think, false; while in their ideal purity, they are not synthetical.

Thus, my good friend and antagonist holds that the combination of oxygen and hydrogen to produce water is not "different in principle" from that of the tetrahedra to produce a hexahedron (¶ 26). There is all the difference between the ideal and the real; which to my Scotistic mind is very important. But this is not the only passage in which he speaks as if form were the principle of individuation.

§ 9. Dr. Carus's position is even weaker than that of Kant, who makes space, for example, a necessary form of thought (in a broad sense of that term). But Dr. Carus appears to consider space as an absolute reality. For he says (¶ 119) that "every single point of space has its special and individual qualities." Here again form is made the principle of individuation; whence the queer phrase, "individual qualities."

§ 10. Dr. Carus argues that whatever is unequivocally determinate is necessary. (¶ 124.) Were the determination spoken of real

dynamic determination, this would be a mere truism. But the expression used, *eindeutig bestimmt*, merely expresses a mathematical determination, and therefore no real necessity ensues. The equation

$$x^2-23x+132\tfrac{1}{4}=0$$

determines x to be either 11·477 or 11·523. In this sense, x has necessarily one value or the other. The equation

$$x^2-12x+6=0$$

determines x to be either 11·477 or 0·523. Together, the two equations uniquely determine x to be 11·477. This shows how much that argument amounts to.

§ 11. By "sameness," Dr. Carus means equivalence for a given purpose. (¶¶ 102, 106.) By the "idea of sameness," he means (¶¶ 77, 96) the principle that things having a common character are for some purpose equivalent. This, he says, "has a solid basis in the facts of experience." By a "world of sameness" (¶ 113), he seems to mean one in which any two given concrete things are in some respect equivalent. He argues (¶ 122) that a "world of sameness is a world in which necessity rules." I do not see this. It seems to me so bald a *non sequitur*, that I cannot but suppose the thought escapes my apprehension. If there were anything in the argument, it would seem to be a marvellously expeditious way of settling the whole dispute; and therefore it would have been worth the trouble of stating, so as to bring it within the purview of minds like mine.

§ 12. My candid opponent sometimes endorses emphatically the Leibnizian principle. "Necessitarianism must be founded on something other than observation. Observation is *a posteriori*; it has reference to single facts, to particulars; yet the doctrine of necessity . . . is of universal application. The doctrine of necessity . . . is of an *a priori* nature." (¶ 11.) "Millions of single experiences . . . cannot establish a solid belief in necessity." (¶ 14.) "No amount of experience is sufficient to constitute causation by a mere synthesis of sequences." (¶ 22.) "Millions of millions of cases" constitute "no proof" that a proposition "is always so." (¶ 29.)

Nevertheless, he holds that the law of "the conservation of matter and energy" so conclusively proves necessary causation, that

the obstinacy of Hume, himself, could not have withstood the argument. (¶ 23.) One wonders, then, what is supposed to prove this "law of the conservation of matter and energy," if no amount of experience can prove it.

But the *a priori* itself can "be based on the firm ground of experience." (¶ 14.) In that case, it is not prior to experience, after all! "The idea of necessity is based upon the conception of sameness, and . . . the existence of sameness is a fact of experience." (¶ 87.) If absolute necessity can be irrefragably demonstrated from the fact that two things are alike, it is a pity Dr. Carus should not state this demonstration in a form that I, and men like me, can understand. That would be more to the purpose than merely saying it can be proved. Absolute chance is rejected as "involving a violation of laws well established by *positive evidence*." (¶ 149.)

All these *denials* that absolute necessity can be established and absolute chance refuted by experiential evidence, mixed with as clear *assertions* of the same things, when taken together, have the appearance of an attempt, as the politicians say, to "straddle" the question.

§ 13. But the ingenious Doctor seeks to bolster up necessity by introducing the confused notion of "causation."

I do not know where the idea originated that a cause is an instantaneous state of things, perfectly determinative of every subsequent state. It seems to be at the bottom of Kant's discourse on the subject; yet it accords neither with the original conception of a cause, nor with the principles of mechanics. The original idea of an efficient cause is that of an agent, more or less like a man. It is prior to the effect, in the sense of having come into being before the latter; but it is not transformed into the effect. In this sense, it may happen that an event is a cause of a subsequent event; seldom, however, is it the principal cause. Far less are events the only causes. The modern mechanical conception, on the other hand, is that the relative positions of particles determine their accelerations at the instants when they occupy those positions. In other words, if the positions of all the particles are given at *two* instants (together with the law

of force), then the positions at all other instants may be deduced.* This doctrine conflicts with Kant's second analogy of experience, as interpreted by him, in no less than four essential particulars. In the first place, far from involving any principle that could properly be termed generation, or *Erzeugung*, which is Kant's word for the sequence of effect from cause, the modern mechanical doctrine is a doctrine of persistence, and, as I have repeatedly explained, positively prohibits any real growth. In the second place, one state of things (i. e. one configuration of the system) is not sufficient to determine a second; it is two that determine a third. To whomsoever may think that this is an inconsiderable divergence of opinions, let me say, study the logic of relatives, and you will think so no longer. In the third place, the two determining configurations, according to mechanics, may be taken at almost any two instants, and the determined configuration be taken at any third instant we like. *There is no mechanical truth in saying that the past determines the future, rather than the future the past.* We habitually follow tradition in continuing to use that form of expression, but every mathematician knows that it is nothing but a form of expression. We continue, for convenience, to talk of mechanical phenomena as if they were regulated, in the same manner in which our intentions regulate our actions (which is essentially a determination of the future by the past), although we are quite aware that it is not really so. Remark how Kant reasons:

"If it is a necessary law of our sensibility, and consequently a *formal condition* of all perceptions, that the preceding time determines the following, (since I can only come to the following through the preceding,) then is it also an indispensable *law of the empirical representation* of the time-series that the appearances of the preceding time determine every occurrence in the following."

What this leads to is a causality like that of mental phenomena, where it *is* the past which determines the future, and *not* (in

* It follows as a corollary from this that if the positions of the particles at any one instant, together with the velocities at that instant, and the law of force, are given, the positions at all instants can be calculated. Of course, to give the positions and velocities at one instant, is a special case of the giving of the positions at two instants. The two instants may be such that there will be more than one solution of the problem; but this is an insignificant detail.

the same sense) the reverse; but the doctrine of the conservation of energy consists precisely in the denial that anything like this occurs in the domain of physics. Had Kant studied the psychological phenomena more attentively and generalised them more broadly, he would have seen that in the mind causation is not absolute, but follows such a curve as is traced in my essay towards "The Law of Mind" (*The Monist*, Vol. II, 550). Does our judicious editor deem it ungracious to find fault with Kant for not doing so much more than he did, considering what that hero-like achievement was? We must seem to carp, as long as thinkers can hold that achievement for sufficient. In the fourth place, Kant's "Analogy" ignores that continuity which is the life-blood of mathematical thought. He deals with those awkward chunks of phenomenon, called "events." He represents one such "event" as determined by certain others, definitely, while the rest have nothing to do with it. It is impossible to cement such thought as this into hermetic continuity with the refined conceptions of modern dynamics. The statement that every instantaneous state of things determines precisely all subsequent states, and not at all any previous states, could, I rather think, be shown to involve a contradiction.

The notion which Dr. Carus holds of a cause seems to be that it is a state, embracing all the positions and velocities of all the masses at one instant, the effect being a similar state for any subsequent instant. (¶¶ 21, 24.) This breaks at once with common parlance, with dynamics, and with philosophical logic. In common parlance, we do not say that the position and upward velocity of a missile is the cause of its being at a subsequent instant lower down and moving with a greater downward velocity.* In dynamics, it is the fixed force, gravitation, or whatever else, together with those relative positions of the bodies that determine the intensity and direction of the forces, that is regarded as the cause. But these causes are not previous to, but simultaneous with, their effects, which are the instantaneous accelerations. Finally, logic opposes our calling

* It would seem to follow from his notion that in uniform motion each minute's motion is the cause of that of the next. Yet he says (¶ 19) "there is no cause that is equal to its effect."

one of two states which equally determine one another (as any two states of a system do, if the velocities are taken to be included in these states) *the* determinator, or cause, simply because of the circumstance that it precedes the other in time,—a circumstance that is upon the principles of dynamics plainly insignificant and irrelevant.

Everybody will make slips in the use of words that have been on his lips from before the time when he learned to think; but the practice which I endeavor to follow in regard to the word *cause*, is to use it in the Aristotelian sense of an *efficient cause*, in all its crudeness. In short, I refuse to use it at all as a philosophical word. When my conception is of a dynamical character, I endeavor to employ the accepted terminology of dynamics;* and when my idea is a more general and logical one, I prefer to speak of the *explanation*.

§ 14. Dr. Carus thinks the element of necessity in causation can be demonstrated by considering the process as a transformation. "It is a sequence of two states which belong together as an initial and final aspect of one and the same event." (¶ 21. Compare ¶¶ 20, 24.) He neglects to explain how he brings under this formula the inward causation of the will and character, as set forth by him in ¶¶ 163–167.

It is unnecessary for me to reply, at length, to an argument so manifestly inconclusive. On the one hand, it conflicts with the principle that absolute necessity cannot be proved from experience; and on the other hand, it leaves room for an imperfect necessity.

Professor Tait has done an ill office to thought in countenancing the idea that the conservation of energy is of the same nature as the "conservation," or rather perduration, of matter. Dr. Carus says (¶ 121) that

> "The law of the conservation of matter and energy rests upon the experience (corroborated by experiments) that causation is transformation. It states that the total amount of matter and the total amount of energy remain constant. There is no creation out of nothing and no conversion of something into nothing."

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* But, as I have elsewhere said, I should like to persuade mathematicians to speak of "positional energy" as *Kinetic potency*, the *vis viva* as *Kinetic energy*, and the total "energy" as the *Kinetic entelechy*.

The historical part of this statement contains only a small grain of truth; but that I will not stop to criticise. The point I wish to make is that the law of the conservation of energy is here represented under a false aspect. The true substance of the law is that the accelerations, or rates of change, of the motions of the particles at any instant depend solely on their relative positions at those instants. The equation which expresses the law under this form is a differential equation of the second order; that is, it involves the rates of change of the rates of change of positions, together with the positions themselves. Now, because of the purely analytic proposition of the differential calculus that

$$D_t{}^2 s = \tfrac{1}{2} D_s (D_t s)^2,$$

the first integral of the differential equation of the second order, that is, the differential equation of the first order which expresses the same state of things, equates half the sum of the masses, each multiplied by the square of its velocity, to a function of the relative positions of the particles *plus* an arbitrary constant.* In order to fix our ideas, let us take a very simple example, that of a single particle accelerated towards an infinite plane, at a rate proportional to the n^{th} power of its distance from the plane. In this case, if s be the distance, the second differential equation will be

$$D_t{}^2 s = -a s^n,$$

and the first integral of it will be

$$(D_t s)^2 = -\frac{2a}{n+1} s^{n+1} + C.$$

By the first law of motion, and the Pythagorean proposition, the part of the velocity-square depending on the horizontal component is also constant.

The arbitrary constant, C, plainly has its genesis in the fact that forces do not determine velocities, but only accelerations. Its value will be fixed as soon as the velocity at any instant is known. This quantity would exist, just the same, and be independent of the time, and would therefore be "conserved" whether the forces were

* The differential equation being an ordinary, not a partial one, this is an absolute constant, determined by initial (or final, or any instantaneous) conditions.

"conservative," that is, simply positional, or not. Now, this constant is the energy; or rather, the energy is composed of this constant increased by another which is absolutely indeterminable, being merely supposed large enough to make the sum positive.

Thus, the law of energy does not prescribe that the total amount of energy shall remain constant; for this would be so in any case by virtue of the second law of motion; but what it prescribes is that the total energy diminished by the living force shall give a remainder which depends upon the relative positions of the particles and not upon the time or the velocities. It is also to be noticed that the energy has no particular magnitude, or quantity. Furthermore, in transformations of kinetical energy into positional energy, and the reverse, the different portions of energy do not retain their identity, any more than, in book-keeping, the identity of the amounts of different items is preserved. In short, the conservation of energy, (I do not mean the *law* of conservation,) is a mere result of algebra. Very different is it with the "conservation" of matter. For, in the first place, the total mass is a perfectly definite quantity; and, in the second place, in all its transformations, not only is the *total* amount constant, but all the different parts preserve their identity. To speak, therefore, of "the conservation of matter and energy," is to assimilate facts of essentially contrary natures; and to say that the law of the conservation of energy makes the total amount of energy constant is to attribute to this law a phenomenon really due to another law, and to overlook what this law really does determine, namely, *that the total energy less the kinetic energy gives a remainder which is exclusively positional.*

§ 15. Dr. Carus does not make it clear what he means by *chance*. He does, indeed, say (¶¶ 145, 146):

"What is chance?

"Chance is any event not especially intended, either not calculated, or, with a given and limited stock of knowledge, incalculable."

This defines what he means by a chance event, in the concrete; what he understands by probability, we are left to conjecture. But from what he says in ¶ 147, I infer that he regards it as dependent upon the state of our ignorance, and therefore nothing real.

I am, therefore, much puzzled when I find him expressing a conviction (¶¶ 88, 156) that chance plays an important part in the real world. He explains very distinctly that "when we call a throw of the dice pure chance, we mean that the incidents which condition the turning up of these or those special faces of the dice have not been, or cannot be, calculated." (¶ 147.) This is the commonest, because the shallowest, philosophy of chance. Even Venn might teach him better than that. However, according to that view, when he writes of "the important part that chance plays in the world,—not absolute chance . . . . but that same chance of which the throw of the die is a typical instance" (¶ 88), he can be understood to mean no more than that many things happen which we are not in condition to calculate or predict. This is not playing a part *in the world*, one would say—at least, not in the natural world; it is only playing a part in our ignorance.

Dr. Carus frequently uses phrases which make us suspect he penetrates deeper. Thus, he says, "we do not believe in absolute chance, but we believe in chance" (¶ 144); and again, "Every man is the architect of his own fortune—but not entirely. There are sometimes coincidences determining the fates of men." (¶ 161.) But when we remark the consecution of ¶¶ 137–162, we feel pretty sure he really sees no further. To do so would have been to perceive that indefinitely varied specificalness *is* chance.

For a long time, I myself strove to make chance that diversity in the universe which laws leave room for, instead of a violation of law, or lawlessness. That was truly believing in chance that was not absolute chance. It was recognising that chance does play a part in the real world, apart from what we may know or be ignorant of. But it was a transitional belief which I have passed through, while Dr. Carus seems not to have reached it.

As for absolute chance, Dr. Carus makes the momentous admission that it is "not unimaginable" (¶ 150). If so, its negation, or absolute necessity, cannot be a formal principle.

§ 16. But it is time for me to leave the consideration of Dr. Carus's system and to take up his strictures upon mine. His philosophy is one eminently enlightened by modern ideas, which it

synthetises to an unusual extent. It is distinguished for its freedom from the vice of one-sidedness, and displays every facet of the gem of philosophical inquiry, except the one on which it rests, the question of absolute law. Its prominent faults, which I feel sure must have struck every competent reader, are that it shows little trace of meditation upon the thoughts of the great idealists, and that there is a certain want of congruity between different elements of it. How strangely it sounds, for instance, to find an apriorian, and one who is dinging "formal laws" so perpetually into our ears, one who holds that "in order to weave the woof of the *a posteriori* elements into coherent cloth, we want the warp of the *a priori*" (¶ 15), to find this man declaring for a positivism "which accepts no doctrine, theory, or law, unless it be a formulation of facts," and proclaiming that "the whole business of science is to systematise the samenesses of experience, and to present them in convenient formulas" (¶ 120). Now there is just one way of bringing such warring elements into harmony, and curing the greatest defect of the system,—and it is a way which would also bring the whole into far better concordance with natural science. It is to lop off the heads of all absolute propositions whose subject is not the Absolute, and reduce them to the level of probable and approximate statements. Were that defalcation performed, Dr. Carus's philosophy would, in its general features, offer no violent opposition to my opinions. Moreover, the Doctor has at heart the conciliation of religion and science. I confess such serious concern makes me smile; for I think the atonement he desires is a thing which will come to pass of itself when time is ripe, and that our efforts to hasten it have just that slight effect that our efforts to hasten the ripening of apples on a tree may have. Besides, natural ripening is the best. Let science and religion each have stout faith in itself, and refuse to compromise with alien and secondary purposes, but push the development of its own thought on its own line; and then, when reconcilement comes,—as come it surely will,—it will have a positive value, and be an unmixed good. But since our accomplished editor thinks himself called upon to assist in this birth of time, let me ask him whether of all the conditions of such peace, the first is not that religious thought should abandon

that extravagant absoluteness of assertion which is proper to the state of intellectual infancy, but which it has so long been too timid to let go? This pragmatical and unneeded absoluteness it is which is most deeply contrary to the method, the results, and the whole spirit of science; and no error can be greater than to fancy that science, or scientific men, rest upon it or readily tolerate it.

§ 17. Dr. Carus (¶¶ 56–64) condemns my method of investigation as contrary to that by which science has been advanced; and holds that a radically different, and thoroughly positivistic method is requisite,—a method so intensely positivistic as to exclude all originality. I suppose he will not object to my forming an opinion concerning the methods of science. I was brought up in an atmosphere of scientific inquiry, and have all my life chiefly lived among scientific men. For the last thirty years, the study which has constantly been before my mind has been upon the nature, strength, and history of methods of scientific thought. I have no space here to argue the question. In its logical aspect, I have partly considered it in various publications; and in its historical aspect, I have long been engaged upon a treatise about it. My critic says (¶ 57) that I am "very positivistic in my logic of science." This is a singular misapprehension. Few of the great scientific minds with whom I have come into personal contact, and from whom I endeavored to learn were disposed to contemn originality or the ideal part of the mind's work in investigation; and those few, it was easy to see, really breathed an atmosphere of ideas which were so incessantly present that they were unconscious of them. Were I to name those of my teachers who were most positivistic in theory, a smile would be excited. My own historical studies, which have been somewhat minutely critical, have, on the whole confirmed the views of Whewell, the only man of philosophical power conjoined with scientific training who had made a comprehensive survey of the whole course of science, that progress in science depends upon the observation of the right facts by minds *furnished with appropriate ideas.* Finally, my long investigation of the logical process of scientific reasoning led me many years ago to the conclusion that science is nothing but a development of our natural instincts. So much for my *theory* of

scientific logic. It is as totally opposed as anything can be to Dr. Carus's theory (¶ 69, note; and "Ursache, Grund und Zweck," p. 2) that originality is out of place in science.

But in my *practice* of scientific reasoning, Dr. Carus accuses me of being what he calls a "constructionist"; that is, a theoriser unguided by indications from observation or accepted facts. To a mind upon whom that celebrated and splendid chapter of Kant upon the architectonical method failed to make a deep impression, I may appear so; but *travesty* is in truth hardly too strong a word to describe the account of my method by Dr. Carus.

Perhaps exaggeration is not without its value. If so, let me sum up the method Dr. Carus recommends. Eschew originality, is its pious formula; do not think for yourself, nor countenance results obtained by original minds. Distrust them; they are not safe men. Leave originality to mathematicians and their breed, to poets, and to all those who seek the sad notoriety of having unsettled belief.* Flee all philosophies which smack of this aberrant nineteenth century.† This theory of Dr. Carus condemns itself; for it is highly original, and soars into the free ether untrammelled by historic facts.

Keppler comes very close to realising my ideal of the scientific method; and he is one of the few thinkers who have taken their readers fully into their confidence as to what their method really has been.‡ I should not feel justified in inflicting upon mine an autobiographical account of my own course of thought; but some things Dr. Carus's accusation forces me to mention. My method of attacking all problems has ever been to begin with an historical and rational inquiry into the special method adapted to the special problem. This is the essence of my architectonical proceeding upon which Dr. Carus has commented very severely. To look an inch before one's nose involves originality: therefore, it is wrong to have a conscious method. But further, in regard to philosophy, not only

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* Dr. Carus calls attention to the connection between my doctrine of the fixation of opinion and his anti-originalism.

† Dr. Carus passes a sweeping judgment on Post-Kantian philosophy, as being original.

‡ This was a remark of my father's.

the methods, but the elementary ideas which are to enter into those methods, should be subjected to careful preliminary examination. This, especially, Dr. Carus finds very unscientific. (¶ 64, and elsewhere.) It is, undoubtedly, the most characteristic feature of my procedure. Certainly it was not a notion hastily or irreflectively caught up; but is the maturest fruit of a lifetime of reflection upon the methods of science, including those of philosophy; and if it shall be found that one contribution to thought on my part has proved of permanent service, that, I expect, will be the one. This method in no wise teaches that the method and materials for thought are not to be modified in the course of the study of the subject-matter. But instead of taking ideas at haphazard, or being satisfied with those that have been handed down from the good old times, as a mind keenly alive to the dangers of originality would have done, I have undertaken to make a systematic survey of human knowledge (a very slight sketch of which composed the substance of my paper on the "Architecture of Theories,") in order to find what ideas have, as a fact, proved most fruitful, and to observe the special utilities they have severally fulfilled. A subsidiary object of this survey was to note what the great obstacles are to-day in the way of the further advance of the different branches of science. In my "Architecture of Theories," I never professed to do more than make a slight sketch of a small portion of my preliminary studies, devoting thirteen lines to some hints as to the nature of the results. In the four following papers I have given a selection of a few of these results. Among those which remain to be reported are some of much more immediate importance than any of those hitherto set forth. If anybody has been surprised to find my subsequent papers developing thoughts which they were unable to foresee from my first, it is only what I warned people from the outset that they would find to happen. Nor have the greatest of these surprises yet been reached.*

The next series of facts reviewed was that of the history of philosophy. I waded right into this fearful slough of "originality," in

* A person in the last *Monist*, breaks in upon my series of articles to foretell what the "issues of synechism" will be. Were he able to do so, it would certainly be the height of ill-manners thus to take the words out of my mouth.

order to gather what seemed to throw a light upon the subject. Finally, I reviewed the general facts of the universe.

I now found myself forced by a great many different indications to the conclusion that an evolutionary philosophy of some kind must be accepted,—including among such philosophies systems like those of Aristotle and of Hegel. From this point the reasoning was more rapid. Evolution had been a prominent study for half a generation; and much light had been thrown upon the conditions for a fruitful evolutionary philosophy. The first question was, how far shall this evolution go back? What shall we suppose *not* to be a product of growth? I fancy it is this cautious reflectiveness of my procedure which especially displeases Dr. Carus. It is not positivistic: it is architectonic. But the answer to the question was not far to seek. If an evolutionary explanation is to be adopted, philosophy, logic, and the economy of research all dictate that in the first essay, at least, that style of explanation be carried as far back as explanation is called for. What elements of the universe require no explanation? This was a simple question, capable of being decided by logic with as much facility and certainty as a suitable problem is solved by differential calculus. Being, and the uniformity in which being consists, require to be explained. The only thing that does not require it is non-existent spontaneity. This was soon seen to mean absolute chance. The conclusion so reached was clinched by a careful reëxamination of the office of chance in science generally, and especially in the doctrines of evolution. Arrived at this point, the next question was, what is the principle by which the development is to proceed? It was a difficult inquiry, and involved researches from different points of view.

But I will not trouble the reader with further autobiographical details. I have given enough to show that my method has neither been in theory purely empirical, nor in practice mere brain-spinning; and that, in short, my friend Dr. Carus's account of it has been as incorrect as can be.

§ 18. The learned doctor (¶¶ 6, 7, 8) pronounces me to be an imitator of David Hume, or, at least, classes my opinions as closely allied to his. Yet be it known that never, during the thirty years in

which I have been writing on philosophical questions, have I failed in my allegiance to realistic opinions and to certain Scotistic ideas; while all that Hume has to say is said at the instance and in the interest of the extremest nominalism. Moreover, instead of being a purely negative critic, like Hume, seeking to annul a fundamental conception generally admitted, I am a positive critic, pleading for the admission to a place in our scheme of the universe for an idea generally rejected. In the first paper of this series, in which I gave a preliminary sketch of such of my ideas as could be so presented, I carefully recorded my opposition to all philosophies which deny the reality of the Absolute, and asserted that "the one intelligible theory of the universe is that of objective idealism, that matter is effete mind." This is as much as to say that I am a Schellingian, of some stripe; so that, on the whole, I do not think Dr. Carus has made a very happy hit in likening me to Hume, to whose whole method and style of philosophising I have always been perhaps too intensely averse. Yet, notwithstanding my present disclaimer, I have little doubt apriorians will continue to describe me as belonging to the sceptical school. They have their wonderful ways of arriving at truth, without stooping to confront their conclusions with facts; and it is amusing to see how sincerely they are convinced that nobody can have science at heart, without denying all they uphold.*

My opponent has a habit of throwing out surprising opinions without the least attempt to illuminate them with the effulgence of reason. Thus he says (¶ 8): "If Kant's answer to Hume had been satisfactory, Mr. Peirce would probably not have renewed the attack." What attack? All that Hume attacked I defend, namely, law as a reality. How could a defence of that which I defend as essen-

* As I am writing, I am shown a letter, in which the writer says: "Peirce with all his materialistic ideas, yet," etc I never promulgated a materialistic idea in my life. The writer simply assumes that science is materialistic. As I am correcting the proofs, I notice that Mr. B. C. Burt, in his new *History of Modern Philosophy*, sets me down as sceptical, though doubtfully. There are a good many inaccuracies in the work. This was inevitable in a first edition. But the ingenious plan of the book admirably adapts it to the wants of just that class of students who cannot understand that no repertory of facts ever can be trusted implicitly.

tial to my position, cause me to surrender that position, namely, that real regularity is imperfect? In any sense in which Hume could have admitted the possibility of law, it must be precisely followed; since its existence could consist only in the conformity of facts unto it. But perhaps Dr. Carus means that if one question had been completely settled, I should probably have confined myself to talking about that, instead of broaching a new one.

§ 19. Another misunderstanding of my position on the part of Dr. Carus (¶¶ 12, 13) is simply due to "boldly" having been twice printed where the reading should have been "baldly," in my paper on "The Doctrine of Necessity." (*The Monist*, Vol. II, p. 336, lines 20 and 25.) I wish printers would learn that I never use the word *bold*. I have so little of the quality, that I don't know what it means. As I read the "revise," as usual, it was presumably my fault that the *erratum* occurred. At any rate, had my meaning been clearly expressed, the proof-reader would not have been misled by my defective chirography. What I was trying to say was, in substance, this: Absolute chance is a hypothesis; and, like every hypothesis, can only be defended as explaining certain phenomena.* Yet to suppose that an event is brought about by absolute chance is utterly illogical, since as a hypothesis it could only be admitted on the ground of its explaining observed facts; now from mere non-law nothing necessarily follows, and therefore nothing can be explained; for to explain a fact is to show that it is a necessary, or, at least, a probable, result from another fact, known or supposed. Why is not this a complete refutation of the theory of absolute chance? *Answer*: because the *existence* of absolute chance, as well as many of its characters, are not themselves absolute chances, or sporadic events, unsubject to general law. On the contrary, these things *are* general laws. Everybody is familiar with the fact that chance has laws, and that statistical results follow therefrom. Very well: I do not propose to explain anything as due to the action of

* Its being hypothetical will not prevent its being established with a very high degree of certainty. Thus, all history is of the nature of hypothesis; since its facts cannot be directly observed, but are only supposed to be true to account for the characters of the monuments and other documents.

chance, that is, as being lawless. I do not countenance the idea that Bible stories, for instance, show that nature's laws were violated;—though they may help to show that nature's laws are not so mechanical as we are accustomed to think. But I only propose to explain the regularities of nature as consequences of the only uniformity, or general fact, there was in the chaos, namely, the general absence of any determinate law.* In fact, after the first step is taken, I only use *chance* to give room for the development of law by means of the law of habits.

§ 20. In ¶ 28, I read: "Mr. Peirce does not object to necessity in certain cases; he objects to necessity being a universal feature of the world." This is correctly stated, and so it is in ¶ 203. I object to necessity being universal, as well as to its ever being exact. In short, I object to absolute universality, absolute exactitude, absolute necessity, being attributed to any proposition that does not deal with the A and the Ω, in the which I do not include any object of ordinary knowledge. But it is careless to write (¶ 193) that I "describe the domain of mind as the absence of law." Is not one of my papers entitled "The Law of Mind"? It is true that I make the law of mind essentially different in its mode of action from the law of mechanics, inasmuch as it requires its own violation; but it is law, not chance uncontrolled. That it is not "an undetermined and indeterminable sporting" should have been obvious from my expressly stating that its ultimate result must be the entire elimination of chance from the universe. That directly negatives the adjective "indeterminable," and hence also the adjective "undetermined." Still more unwarranted is the statement (¶ 205) that I deny "that there are samenesses in this world." If the slightest excuse for such an accusation can be found in all my writings I shall be mightily surprised.

§ 21. Dr. Carus fully admits (¶ 9) the justice of my first reply to the argument that necessity is postulated in all scientific reasoning, which reply is that to postulate necessity does not make it true.

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* Somebody may notice that I here admit a proposition as absolutely true. Undoubtedly; because it relates to the Absolute.

As this reply, if correct is complete, Dr. Carus was bound after that admission to drop the postulate-argument in favor of necessity.* But he takes no notice, at all, of my four-page argument to show that scientific reasoning does *not* postulate absolute universality, exactitude, or necessity (*The Monist*, Vol. II, pp. 324–327); but calmly asserts, four or five times over (¶¶ 5, 11, 16, 62, 79), without one scintilla of argumentation, that that postulate *is* made, and uses this as an argument in favor of necessity.

§ 22. He also fully admits (¶¶ 11, 14, 22) the justice of my argument that the absoluteness of universality, exactitude, and necessity, cannot be proved, nor rendered probable, by arguments from observation. That argument consisted in assuming that all arguments from observation are probable arguments, and in showing that probable inferences are always affected with probable errors.

Had I deemed it requisite, I might easily have fortified that argument by a more profound analysis of scientific reasoning. Such an analysis I had formerly given in my "Theory of Probable Inference" (in "Studies in Logic," Boston: Little and Brown).

But, notwithstanding his admissions, Dr. Carus sets up his *ipse dixit* against my argumentation. "We deny most positively," says the editorial Elohim, "that the calculus of probabilities is applicable to the order of the world, as to whether it may or may not be universal." (¶¶ 27, 31.)

To support this, he cites (¶¶ 31–34) four passages from articles written by me sixteen years ago. I hope my mind has not been stationary during all these years; yet there is little in those old articles which I now think positively erroneous, and nothing in the passages cited. My present views had, at that time, already begun to urge themselves on my mind; but they were not ripe for public avowal. In the first of the passages cited, I express the opinion, which I first uttered in my earlier lectures before the Lowell Institute, in 1866, afterwards in the *Popular Science Monthly* in 1877, in

* Indeed, to admit that reply is all but to admit the non-absolute grade of necessity.

still fuller elaboration in my "Theory of Probable Inference" in 1882, and maintain now as strongly as ever, that no definite probability can be assigned to any general arrangement of nature. To speak of an *antecedent* probability would imply that there was a statistical science of different universes; and a *deduced* probability requires an antecedent probability for one of its data.* This consideration only goes to fortify my present position, that we cannot conclude from observed facts with any degree of probability, and therefore *a fortiori* not with certainty, that any proposition is absolutely universal, exact, or necessary. In the absence of any weight of probability in favor of any particular exact statement, the formal presumption is altogether against any one out of innumerable possible statements of that kind.

The second passage cited is one in which I argue that the universe is not a chaos, or chance-medley. Now Dr. Carus admits (¶ 28) that I do not to-day maintain that it is a chance-medley.

The third passage cited is this: "A contradiction is involved in the very idea of a chance-world." This is in entire harmony with my present position that "a chaos . . . . being without connection or regularity would properly be without existence." ("Architecture of Theories," *The Monist*, Vol. I, p. 176.)

The fourth passage is to the effect that "the interest which the uniformities of nature have for an animal measures his place in the scale of intelligence." This I still believe.

So much for my supposed contradictions. If I am not mistaken, our amiable editor, whose admirable editorship springs so largely out of his amiability, in copying out these passages was really not half so much intent on showing me to be wrong at present, as on showing me to have been right formerly. However hard he hits, he contrives to honey his sockdologers, and sincerely cares more to make the reader admire his antagonist when he is right than to condemn him when he is wrong. There is a touch of art in this that proclaims the born editor, and which I can hardly hope to imitate.

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* I rightly go somewhat further in my *Theory of Probable Inference*; but that has no bearing on the present discussion.

Though Dr. Carus admits over and over again that necessity cannot be based on observation, he often slips back to the idea that it can be so based. He says, (¶ 30) that "form is a quality of this world, not of some samples of it, but throughout, so far as we know of existence in even the most superficial way." But does he not see that all we *do* know, and all we *shall* to-morrow, or at any date know, is nothing but a sample of our possible experience,—nay, is but a sample of what we are in the future to have already experienced? I have characterised inductive inference as reasoning from samples; but the most usual way of sampling a class is by examining *all* the instances of it that have come under our observation, or which we can at once collect.

§ 23. Dr. Carus (¶¶ 44, 46) holds that from my social theory of reality, namely, that the real is the idea in which the community ultimately settles down, the existence of something inevitable is to be inferred. I confess I never anticipated that anybody would urge that. I thought just the reverse might be objected, namely, that all absoluteness was removed from reality by that theory; and it was many years ago that, in my "Theory of Probable Inference," I admitted the obvious justice, as it seemed to me, of that objection. We cannot be quite sure that the community ever will settle down to an unalterable conclusion upon any given question. Even if they do so for the most part, we have no reason to think the unanimity will be quite complete, nor can we rationally presume any overwhelming *consensus* of opinion will be reached upon every question. All that we are entitled to assume is in the form of a *hope* that such conclusion may be substantially reached concerning the particular questions with which our inquiries are busied.

Such, at least, are the results to which the consideration of the doctrine of probability brings my mind irresistibly. So that, the social theory of reality, far from being incompatible with tychism, inevitably leads up to that form of philosophy. Socialistic, or as I prefer to term it, agapastic ontology seems to me likely to find favor with many minds at an early day, because it is a natural path by which the nominalist may be led into the realistic ways of thought, ways toward which many facts and inward forces impel him. It is

well, therefore, to call attention to the circumstances that the realism to which it leads is a doctrine which declares general truths to be real,—independent of the opinions of any particular collection of minds,—but not to be destined, in a strictly universal, exact, and sure acceptation, to be so settled, and established. Now to assert that general truths are objectively real, but to deny that they are strictly universal, exact, and certain, is to embrace the doctrine of absolute chance. Thus it is that the agapastic ontologist who endeavors to escape tychism will find himself "led into" that "inextricable confusion" which Dr. Carus (¶ 4) has taken a contract to show that I am led into.

§ 24. Conservatism is wholesome and necessary; the most convinced radical must admit the wisdom of it, in the abstract; and a conservative will be in no haste to espouse the doctrine of absolute chance. I, myself, pondered over it for long years before doing so. But I am persuaded, at length, that mankind will before very long take up with it; and I do not believe philosophers will be found tagging on to the tail of the general procession.

My little dialogue between the tychist and the necessitarian (*The Monist*, Vol. II, pp. 331–333) seems to have represented pretty fairly the views of the latter; for Dr. Carus, in ¶¶ 151–155, does little more than reiterate them, without much, if at all, reinforcing them. His ¶¶ 158–160 merely work out, in a form perhaps not quite clear, what is manifest from the elementary principles of dynamics, and was considered in my dialogue.

His arguments in this connection, apart from those already noticed, are that absolute chance is something which if it existed would require explanation, that the manifold specificalness of nature is explained by law without any aid from chance, and that absolute chance if it existed, in the sense in which it is supposed to exist in my chaos, could not possibly breed law as supposed by me. To the consideration of these arguments I proceed to apply myself.

§ 25. One of the architectonic—and, therefore, I suppose, by Dr. Carus considered as highly reprehensible—features of my theory, is that, instead of saying off-hand what elements strike me as requiring explanation and what as not doing so, which seems to be his

way, I have devoted a long time to the study of the whole logical doctrine of explanation, and of the history of explanations, and have based upon the general principles so ascertained my conclusions as to what things do and what do not require to be explained.

Dr. Carus (¶ 67) defines *explanation* as a description of a special process of nature in such a way that the process is recognised as a transformation. This I cannot quite grant. First, I cannot admit that "special processes of nature" are the only things to be explained. For instance, if I were to meet a gentleman who seemed to conform scrupulously to all the usages of good society, except that he wore to an evening party an emerald satin vest, that would be a fact calling for explanation, although it would not be a "special process of nature." Second, I cannot admit that an explanation is a description of the fact explained. It is true that in the setting forth of some explanations, it is convenient to restate the fact explained, so as to set it under another aspect; but even in these cases, the statement of *other* facts is essential. In all cases, it is *other facts*, usually hypothetical, which constitute the explanation; and the process of explaining is a process by which from those other facts the fact to be explained is shown to follow as a consequence, by virtue of a general principle, or otherwise. Thus, a "special process of nature" calling for explanation is the circumstance that the planet Mars, while moving in a general way from west to east among the fixed stars, yet retrogrades a part of the time, so as to describe loops in the heavens. The explanation is that Mars revolves in one approximate circle and we in another. Again, it has been stated that a warm spring in Europe is usually followed by a cool autumn, and the explanation has been offered that so many more icebergs than usual are liberated during a warm spring, that they subsequently lower sensibly the temperature of Europe. I care little whether the fact and the explanation are correct or no. The case illustrates, at any rate, my point that an explanation is a special fact, supposed or known, from which the fact to be explained follows as a consequence. Third, I cannot admit that every description which recognises the fact described as a transformation is an explanation; far less that "it is complete and exhaustive" (¶ 67).

A magician transforms a watch into a dove. Recognise it as a transformation and the trick is explained, is it? This is delightfully facile. Describe the change from a caterpillar to a butterfly as a transformation, and does that explain it? Fourth, I cannot admit that every explanation recognises the fact explained as a transformation. The explanation of the loops in the motion of Mars is not of that nature. But I willingly recognise in Dr. Carus's definition an attempt,—more or less successful,—to formulate one of the great offices of scientific inquiry, that of bridging over the gap between the familiar and the unfamiliar.

Explanation, however, properly speaking, is the replacement of a complex predicate, or one which seems improbable or extraordinary, by a simple predicate from which the complex predicate follows on known principles. In like manner, a *reason*, in one sense, is the replacement of a multiple subject of an observational proposition by a general subject, which by the very conditions of the special experience is predicable of the multiple subject.* Such a reason may be called an explanation in a loose sense.

Accordingly, that which alone requires an explanation is a coincidence.

Hence, I say that a uniformity, or law, is *par excellence*, the thing that requires explanation. And Dr. Carus (¶ 51) admits that this "is perfectly true."

But I cannot imagine anything further from the truth than his statement (¶ 66) that "the only thing in the world of which we cannot and need not give account is the existence of facts itself." I should say, on the contrary, that the existence of facts is the only thing of which we need give account. Forms may indulge in whatever eccentricities they please in the world of dreams, without responsibility; but when they attempt that kind of thing in the world of real existence, they must expect to have their conduct inquired into. But should Dr. Carus reply that I mistake his meaning, that it is only "being in general" (¶ 66) that he holds unaccountable, I

* Dr. Carus, in his *Ursache, Grund und Zweck*, well says that *reasons* are discovered by induction, in the strict sense. It is often admitted that *causes* can only be inferred by hypothetic reasoning.

reply that this is simply expressing scepticism as to the possibility and need of philosophy. In a certain sense, my theory of reality, namely that reality is the dynamical reaction of certain forms upon the mind of the community, is a proposed explanation of being in general; and be it remarked that the mind of the community, itself, is the thing the nature of whose being this explanation first of all puts upon an idealistic footing.

Chance, according to me, or irregularity,—that is, the absence of any coincidence,—calls for no explanation. If *law* calls for a particular explanation, as Dr. Carus admits it does, surely the mere absence of law calls for no further explanation than is afforded by the mere absence of any particular circumstance necessitating the result. An explanation is the conception of a fact as a necessary result, thereby accounting for the coincidence it presents. It would be highly absurd to say that the absence of any definite character, must be accounted for, as if it were a peculiar phenomenon, simply because the imperfection of language leads us so to talk of it. Quite unfounded, therefore, is Dr. Carus's opinion that "chance needs exactly as much explanation as anything else" (¶ 53);—an opinion which, so far as I can see, rests on no defensible principle.

Equally hasty is his oft repeated objection (¶¶ 55, 58, 61) that my absolute chance is something ultimate and inexplicable. I go back to a chaos so irregular that in strictness the word existence is not applicable to its merely germinal state of being; and here I reach a region in which the objection to ultimate causes loses its force. But I do not stop there. Even this nothingness, though it antecedes the infinitely distant absolute beginning of time, is traced back to a nothingness more rudimentary still, in which there is no variety, but only an indefinite specificability, which is nothing but a tendency to the diversification of the nothing, while leaving it as nothing as it was before. What objectionable ultimacy is here? The objection to an ultimate consists in its raising a barrier across the path of inquiry, in its specifying a phenomenon at which questions must stop, contrary to the postulate, or hope, of logic. But what question to which any meaning can be attached am I forbidding by my absolute chance? If what is demanded is a theological backing,

be repeated in inverse succession. Hence, when physicists find themselves confronted with a phenomenon which takes place only in one order of succession and never in the reverse order,—of which no better illustration could be found than the phenomena of growth, for nobody ever heard of an animal growing back into an egg,—they always take refuge in the laws of probability as preventive of the velocities ever getting so reversed. To understand my argument number 1, it is necessary to make this method of escape from apparent violations of the law of energy quite familiar to oneself. For example, according to the law of energy, it seems to follow (and by the aid of the accepted theory of light it does follow) that if a prism, or a grating, disperses white light into a spectrum, then the colors of the spectrum falling upon the prism or grating at the same angles, and in the same proportions, will be recombined into white light; and, everybody knows that this does in fact happen. Nevertheless, the usual and prevalent effect of prisms and gratings is to produce colored spectra. Why? Evidently, because, by the principles of probability, it will rarely happen that colored lights converging from different directions will fall at just the right angles and in just the right proportions to be recombined into white light. So, when physicists meet with the phenomena of frictional and viscous resistance to a body in motion, although, according to their doctrine, if the molecules were to move with the same velocities in opposite directions the moving body would be accelerated, yet they say that the laws of probability, applied to the trillions of molecules concerned, render this practically certain not to occur. I do no more, then, than follow the usual method of the physicists, in calling in chance to explain the apparent violation of the law of energy which is presented by the phenomena of growth: only instead of chance as they understand it, I call in absolute chance. For many months, I endeavored to satisfy the data of the case with ordinary *quasi* chance; but it would not do. I believe that in a broad view of the universe, a simulation of a given elementary mode of action can hardly be explained except by supposing the genuine mode of action somewhere has place. If it is improbable that colored lights should fall together in just such a way as to give a white ray, is it not an equally

extraordinary thing that they should all be generated in such a way as to produce a white ray? If it is incredible that trillions of molecules in a fluid should strike a solid body moving through it so as to accelerate it, is it not marvellous that trillions of trillions of molecules all alike should ever have got so segregated as to create a state of things in which they should be practically certain to retard the body? It is far from easy to understand how mere positional forces could ever have brought about those vast congregations of similar atoms which we suppose to exist in every mass of gas, and by which we account for the apparent violations of the law of energy in the phenomena of the viscosity of the gas. There is no difficulty in seeing how sulphuric acid acting on marble may produce an aggregation of molecules of carbonic anhydride, because there are similar aggregations in the acid and in the marble; but how were such aggregations brought about in the first place? I will not go so far as to say that such a result is manifestly impossible with positional forces alone; but I do say that we cannot help suspecting that the simulated violation of the law of energy has a real violation of the same law as its ultimate explanation. Now, growth *appears* to violate the law of energy. To explain it, we must, at least, suppose a simulated, or *quasi*, chance, such as Darwin calls in to produce his fortuitous variations from strict heredity. It may be there is no real violation of the law, and no real chance; but even if there be nothing of the sort in the immediate phenomenon, can the conditions upon which the phenomenon depends have been brought about except by real chance? It is conceivable, again, that the law of the conservation of forces is not strictly accurate, and that, nevertheless, there is no absolute chance. But I think so much has been done to put the law of the conservation of forces upon the level of the other mechanical laws, that when one is led to entertain a serious doubt of the exactitude of that, one will be inclined to question the others.

Besides, few psychologists will deny the very intimate connection which seems to subsist between the law, or *quasi*-law, of growth and the law of habit, which is the principal, if not (as I hold it to be) the sole, law of mental action. Now, this law of habit

seems to be quite radically different in its general form from mechanical law, inasmuch as it would at once cease to operate if it were rigidly obeyed; since in that case all habits would at once become so fixed as to give room for no further formation of habits. In this point of view, then, growth seems to indicate a positive violation of law.

Let us now consider argument number 3: and remark how it fortifies number 1. Physical laws that appear to be radically different yet present some striking analogies. Electrical force appears to be polar. Its polarity is explained away by Franklin's one-fluid theory, but in that view the force is a repulsion. Now, gravitation is an attraction, and is, therefore, essentially different from electricity. Yet both vary inversely as the square of this distance. Radiation, likewise follows the same formula. In this last case, the formula, in one aspect of it, follows from the conservation of energy. In another aspect of it, it results from the principle of probability, and does not hold good, in a certain sense, when the light is concentrated by a lens free from spherical aberration. But neither the conservation of energy nor the principle of probability seems to afford any possible explanation of the application of this theory to gravitation nor to electricity. How, then, are such analogies to be explained? The law of the conservation of energy and that of the perduration of matter present so striking an analogy that it has blinded some powerful intellects to their radically different nature. The law of action and reaction, again, has often been stated as the law of the conservation of momentum. Yet it is not only an independent law, but is even of a contrary nature, inasmuch as it is only the algebraical sum of opposite momenta that is "conserved."* How is this striking analogy between three fundamental laws to be explained? Consider the still more obvious analogy between space and time. Newton argues that the laws of mechanics prove space and time to be absolute entities. Leibniz, on the other hand, takes them as laws of nature. Either view calls for an explanation of the

* The conservation of a vortex, which consists of the preservation of a certain charater of motion by the same particles, though derived from the coöperation of other laws, is, in form, quite different.

analogy between them, which no such reflection as the impossibility of motion without that analogy can supply. Kant's theory seems to hint at the possibility of an explanation from both being derived from the nature of the same mind. Any three orthogonal directions* in space are exactly alike, yet are dynamically independent.

These things call for explanation; yet no explanation of them can be given, if the laws are fundamentally original and absolute.

Moreover, law itself calls for explanation. But how is it to be explained if it is as fundamentally original and absolute as it is commonly supposed to be? Yet if it is not so absolute, there is such a phenomenon as absolute chance.

Thus, the chance which growth calls for is now seen to be absolute, not *quasi* chance.

Now consider argument number 2. The variety of the universe so far as it consists of unlikenesses between things calls for no explanation. But so far as it is a general character, it ought to be explained. The manifold diversity or specificalness, in general, which we see whenever and wherever we open our eyes, constitutes its liveliness, or vivacity. The perception of it is a direct, though darkling, perception of God. Further explanation in that direction is uncalled for. But the question is, whether this manifold specificalness was put into the universe at the outset, whether God created the universe in the infinitely distant past and has left it to its own machinery ever since, or whether there is an incessant influx of specificalness. Some of us are evolutionists; that is, we are so impressed with the pervasiveness of growth, whose course seems only here and there to be interrupted, that it seems to us that the universe as a whole, so far as anything can possibly be conceived or logically opined of the whole, should be conceived as growing. But others say, though parts of the universe simulate growth at intervals, yet there really is no growth on the whole,—no passage from a simpler to a more complex state of things, no increasing diversity.

Now, my argument is that, according to the principles of logic,

* In speaking of directions, we assume the Euclidean hypothesis that the angles of a triangle are equal to two right angles.

we never have a right to conclude that anything is absolutely inexplicable or unaccountable. For such a conclusion goes beyond what can be directly observed, and we have no right to conclude what goes beyond what we observe, except so far as it explains or accounts for what we observe. But it is no explanation or account of a fact to pronounce it inexplicable or unaccountable, or to pronounce any other fact so. Now, to say no process of diversification takes place in nature leaves the infinite diversity of nature unaccounted for; while to say the diversity is the result of a general tendency to diversification is a perfectly logical probable inference. Suppose there be a general tendency to diversification; what would be the consequence? Evidently, a high degree of diversity. But this is just what we find in nature. It does not answer the purpose to say there is diversity because God made it so, for we cannot tell what God would do, nor penetrate his counsels. We see what He *does* do, and nothing more. For the same reason one cannot logically infer the existence of God; one can only know Him by direct perception.

It is to be noted that a general tendency to diversification does not explain diversity in its specific characters; nor is this called for. Neither can such a tendency explain any specific fact. Any attempt to make use of the principle in that manner would be utterly illogical. But it can be used to explain universal facts, just as quasi-chance is used to explain statistical facts. Now, the diversity of nature is a universal fact.

To explain diversity is to go behind the chaos, to the original undiversified nothing. Diversificacity was the first germ.

Argument No. 4 was, upon its negative side, sufficiently well presented in my "Doctrine of Necessity Examined." Mechanical causation, if absolute, leaves nothing for consciousness to do in the world of matter; and if the world of mind is merely a transcript of that of matter, there is nothing for consciousness to do even in the mental realm. The account of matters would be better, if it could be left out of account. But the positive part of the argument, showing what can be done to reinstate consciousness as a factor of the universe when once tychism is admitted, is reinforced in the later papers. This ought to commend itself to Dr. Carus, who shows

himself fully alive to the importance of that part of the task of science which consists in bridging gaps. But consciousness, for the reason just stated, is not to be so reinstated without tychism ; nor can the work be accomplished by assigning to the mind an occult power, as in two theories to be considered in the section following this. As might be anticipated, (and a presumption of this kind is rarely falsified in metaphysics,) to bridge the gap synechism is required. Supposing matter to be but mind under the slavery of inveterate habit, the law of mind still applies to it. According to that law, consciousness subsides as habit becomes established, and is excited again at the breaking up of habit. But the highest quality of mind involves a great readiness to take habits, and a great readiness to lose them ; and this implies a degree of feeling neither very intense nor very feeble.

I have noticed above (§ 7) Dr. Carus's dubious attitude toward the first argument. I considered in the last section his attempted reply to the second. To the third argument, he replies (¶ 65) that law ought to be accounted for by the principle of sufficient reason. But, of course, that principle cannot recommend itself to me, a realist; for it is nothing but the lame attempt of a nominalist to wriggle out of his difficulties. Reasons explain nothing, except upon some theistic hypothesis which may be pardoned to the yearning heart of man, but which must appear doubtful in the eyes of philosophy, since it comes to this, that Tom, Dick, and Harry are competent to pry into the counsels of the Most High, and can invite in their cousins and sweethearts and sweethearts' cousins to look over the original designs of the Ancient of Days.

§ 27. My fourth argument it is which seems to have made most impression upon Dr. Carus's mind (¶ 85), and his reply is rather elaborate.

While embracing unequivocally the necessitarian dogma, equally for mind and for matter (¶ 193), Dr. Carus wishes utterly to repudiate materialism and the mechanical philosophy (¶ 133). To facilitate his, thus, walking the slack-rope, he makes (¶ 168) a division of events into "(1) mechanical, (2) physical, (3) chemical, (4) physiological, and (5) psychical events." The first three (¶¶ 169–171)

are merely distinguished by the magnitude of the moving masses, so that, for philosophical purposes, they do not differ at all. As for physiological events, though he devotes a paragraph (¶ 172) to their definition, he utterly fails to distinguish them from the mechanical (including the physical and chemical) on the one hand, or from the psychical on the other. Dr. Carus seems to think (¶ 176) that by this division he has separated himself entirely from the materialists; but this is an illusion, for nobody denies the existence of feelings.

The truth is, he distinctly enrolls himself in the mechanical army when he asserts that mental laws are of the same necessitarian character as mechanical laws (¶ 193). The only question that remains as to his position is whether he is a materialist or not. He instances (¶ 185) the case of a general receiving a written dispatch and being stimulated into great activity by its perusal, and causing great motions to be made and missiles to be sped in consequence. Now, the dilemma is this. Will Dr. Carus, on the one hand, say that the motion of those missiles was determined by mechanical laws alone, in which case, it would only be necessary to state all the positions and velocities of particles concerned, a hundred years before, to determine just how those bullets would move and, consequently, whether the guns were to be fired or not, and this would constitute him a materialist, or will he say that the laws of motion do not suffice to determine motions of matter, in which case, since they formally certainly do so suffice, they must be *violated*, and he will be giving to mind a direct dynamical power which is open to every objection that can be urged against tychism?

Now admire the decision with which he cuts the Gordian knot!

"THERE ARE NO PURELY MECHANICAL PHENOMENA." (¶ 175.)

That is,

"*The laws of motion* ARE *applicable to and will explain all motions.*" (¶ 177.)

But hold!

"The mechanical philosopher . . . . feels warranted in the hope that . . . . the actions of man . . . . can be explained by the laws of motion . . . . We may anticipate that this conclusion will prove ERRONEOUS. *And so it is.*" (¶ 176.)

At the same time,

"NO OBJECTION CAN BE MADE *to the possibility of explaining the delicate motions*

in the nervous substance of the brain by the laws of molar or molecular mechanics." (¶ 178.)

Yet,

"*The simplest* psychical reflexes, including those *physiological reflexes* which we must suppose to have originated by conscious adaptation . . . . CANNOT *be explained from mechanical* or physical *laws* alone." (¶ 186.)

However,

"*We do* NOT *say that there are motions* . . . . in the brain . . . . *which form exceptions to the laws of mechanics.*" (¶ 187.)

Nevertheless,

"The brain-atoms are possessed of the same spontaneity as the atoms of a gravitating stone. Yet there is present an additional feature; there are present states of awareness . . . . Neither states of awareness nor their meanings can be weighed on any scales, be they ever so delicate, nor are they determinable in foot-pounds." (¶ 192.)

Clearness is the first merit of a philosopher; and what ¶ 192 comes to is crystal-clear. Dr. Carus wants to have the three laws of motion always obeyed; but he wishes the forces between the molecules to be varied according to the momentary states of awareness. All right: he is entitled to suppose whatever he likes, so long as the supposition is self-consistent, as this supposition is. It conflicts with the law of energy, it is true; for that law is that the forces depend on the situations of the particles alone, and not on the time. It is liable to give rise to perpetual motion. It was intended, no doubt, to be an improvement on my molecular theory of protoplasm, earlier in the same number. It escapes materialism. It supposes a direct dynamical action between mind and matter, such as has not been supposed by any eminent philosopher that I know of for centuries. I am sorry to say that it shows a dangerous leaning toward originality. The argument for thus rejecting the law of the conservation of energy, I leave to others to be weighed. It seems to suppose a much larger falsification of that law than my doctrine; but it is a pretty clever attempt to escape my conclusions. It rejects what has to be rejected, the law of the conservation of energy; and is far more intelligent than the theory of those (like Oliver and Lodge) who wish to give to mind a power of deflecting atoms, which would

satisfy the conservation of energy while violating the law of action and reaction. If it can have due consideration, I doubt not it will accelerate the acceptance of my views. Meantime, I do not see where that "inextricable confusion" into which I was to be led is to come in. (¶ 4.)

§ 28. Little more requires to be noticed in Dr. Carus's articles. He admits (¶ 2) that indeterminism is the more natural belief, which is no slight argument in its favor.

§ 29. The remarks upon the theological bearings of the theories, if they are found somewhat wide of the mark, are explained by the haste of the editor to show just what all the affiliations of my views were, before I had had time to explain what those views are. The remarks to which I refer will be found in ¶¶ 3, 36, 81, 82, 83, 128, 203, 204. They are worth putting together.

§ 30. The doctrine of symbolism, to which Dr. Carus has recourse, seems to be similar to that of my essay "Some Consequences of Four Incapacities" (*Journal of Speculative Philosophy*, II.) (¶¶ 180, 183, 199.) On this head, I can only approve of his ideas.

§ 31. It is true that I wrote many definitions for one of the "encyclopedic lexicons." But they were necessarily rather vaguely expressed, in order to include the popular use of terms, and in some cases were modified by proof-readers or editors; and for reasons not needful here to explain, they are hardly such as I should give in a Philosophical Dictionary proper.

C. S. PEIRCE.

THE FOUNDER OF TYCHISM, HIS METHODS, PHILOSOPHY, AND CRITICISMS.

IN REPLY TO MR. CHARLES S. PEIRCE.

INTRODUCTORY AND PERSONAL.

SOON after I had received Mr. Peirce's manuscript he wrote me in a private letter as follows:

"You have not found, I trust, that in my rejoinder I have anywhere overstepped the limit of amiable disputation. If anything of that kind did, unconsciously to me, in the heat of composition, slip from my pen, I am most anxious to have it pointed out to me, so that there may be no feeling in the matter of a disagreeable kind. For if you should not mention it, I should at some future time discover it, and it would be a source of real unhappiness to me."

This is a very amiable disposition of mind. Mr. Peirce presses me very hard in the struggle for truth: he does not hesitate to take advantage of even the smallest weak point which he espies or rather which he believes he espies. He does not shrink from using plain terms, such as "absurd," "unthinking," "weak," "hasty," "irrational." Yet he preserves in the heat of the controversy a friendly spirit towards his antagonist, which I cannot but appreciate and wish publicly to acknowledge. But I would not have him change a word or soften the language of his article in the least, *for my sake*. If Mr. Peirce is wrong, I will take care of myself; if he is right, let the truth come out.

We are both, as it were, by profession champions of truth; so we need not mind an occasional fling if in the end the cause of truth be promoted. Especially, in the present case, I need not mind the

hard blows which Mr. Peirce deals with such assurance, for all the points at which he strikes are well protected. The fiercer the onslaught, the better the test. I feel satisfied that his severe scrutiny only serves to prove the strength of the position which I defend.

I shall speak my mind as freely and unreservedly as does Mr. Peirce, and hope he in his turn will resent plain words as little as I do. As offense is not intended, so offense should not be taken.

Let me add here in these introductory remarks that I am always open to conviction. The views which I uphold have been well considered and thought out in their most important consequences. They are consistent and well guarded in spite of Mr. Peirce's thinking the contrary, so that I feel no need of changing them. But should some unforeseen difficulty arise which would oblige me to revise the whole system of my ideas, I shall not hesitate publicly to confess it and allow myself to be lead by truth whithersoever it be.

* * *

The issue of our controversy is the problem of chance—not of chance as it occurs, for instance, in the throw of dice, but of "absolute chance," or perfect lawlessness. Mr. Peirce makes absolute chance the corner-stone of his philosophy; he propounds a radical and sweeping indeterminism, while I reject the idea, not of chance, but of absolute chance as incompatible with the philosophy of science.

I. DIFFERENCES OF METHOD.

Mr. Peirce calls himself a Scotist and professes to represent mediæval Realism, speaking at the same time of me as a Nominalist. We find, however, that the inverse statement would be nearer the truth.

Before discussing Mr. Peirce's philosophy itself, we must examine his methods. Difference of method will produce important divergencies of opinion.

1. ATTENTION TO DETAIL.

Mr. Peirce takes up in his rejoinder many incidental points, which have little or no bearing upon the main issues between us. On the one hand, things of no consequence, such as my granting

that "absolute chance" like the impossibilities of fairy tales, is not unimaginable, and my saying that tychism is attractive but weak for lack of arguments, are adduced as "momentous admissions," and "inconsiderate concessions." On the other hand, Mr. Peirce catches at straws to prove a lack of information on my part. He cannot forbear calling attention to the little breach of etiquette committed in not giving an English baronet his proper title.

Mr. Peirce shows on all these and other occasions a love of the incidental, and if I were to allow myself to follow his example the battle would soon be broken up into innumerable skirmishes.

It is noteworthy that Mr. Peirce's procedure appears to be a nominalistic tradition. Nominalists, regarding universals as mere names of many particular things, have always showed a great preference for the single, the incidental, the scattered; while realists viewing universals as real things were in the habit of laying perhaps too much stress upon universalities and generalities to the neglect of the particular and individual.

Indeed, Mr. Peirce's favorite idea, which is a belief in absolute chance, is in my opinion the most nominalistic and anti-realistic proposition I have ever met with. Regularity, or natural law, is to him the product of evolution. Thus he demolishes the eternity of the universal, and eternity is only universality in time. Now suppose that eternity (i. e. universality in time) could be proved an error; then, the universality of the universal in space also will become illusory. If those abiding features of nature which we call natural laws have indeed originated from a general sporting, from chance, from a chaotic lawlessness, by a gradual habit taking, who can assure us that nature has not taken different habits in other parts of the universe?

I look upon Mr. Peirce as an extreme nominalist, or, if he prefers it, as a nominal realist soaked with nominalistic opinions. He professes to be a realist, but he rescinds the foundation of realism.

Like the bear of the hermit Mr. Peirce throws the stone at the fly of necessary connection, and in doing so kills the philosophy of realism itself.

2. ORIGINALITY.

Originality, wherever we find it, is pleasing; but a hankering after originality is dangerous. Experience teaches us to regard a thinker's love of originality as one of the main causes of his going astray. Let the poet be original, but not the scientist, not the philosopher, not the searcher for truth. The conceit of being original flatters our vanity, and original ideas in philosophy are tantamount to original errors.

I do not deny the value of originality, but I do deny that it is a criterion of truth.

Originality consists in the free exercise of our imagination, and a vivid imagination is very valuable to the thinker. But it so happens that every dreamer cherishes with a mother's love the children of his fancy. And it is, therefore, necessary to be especially critical with the offspring of one's own brain.

Kepler ("who," Mr. Peirce says, "comes very close to realising my ideal of the scientific method") was endowed with an extraordinarily vivid imagination. He invented an extremely original scheme of explanation for the solar system, and expounded it with great poetical fervor in his "Mysterium Cosmographicum."*

Kepler at once became famous by his "Mysterium Cosmographicum" and was generally admired for his originality. But his bent for hatching original ideas did not alone make Kepler what he is to us now in the history of science. A greater quality than his poetical fervor and original imagination was his rigorous self-criticism. He took notice of every little fact that did not agree with his

* Kepler's scheme is, that all the regular solids, icosahedron, dodecahedron, octohedron, tetrahedron, and cube should be placed one within the other at such distances that spheres could be described between them so as to touch the corners of each respective interior and the planes of each respective exterior solid. He found, by placing the sun in the centre and allowing the planets to move in great circles on the spheres, (making the circle between the icosahedron and dodecahedron equal to the orbit of the earth,) that then the distances between the planets would, upon the whole, agree with astronomical observations.

This theory is as ingenious, as fascinating, and as original as Mr. Peirce's propositions. It has only one little fault; it does not agree with facts. And Kepler afterwards abandoned his original theory.

theories, and for the sake of truth, of objectively provable truth, that is, the agreement of his views with positive facts, he sternly slew all those creatures of his fancy which he foresaw could not survive.

Having myself a good deal of imagination, and having tried myself many original ideas, I can appreciate the self-denial and discipline of Kepler. I have come to the conclusion that originality is only an important means of attaining truth. Our ways of reaching the truth, our methods of finding it, may deserve the praise of originality, but truth itself is never original; for truth is the faithfulness of a copy which in our representations we make of reality, and to praise ideas as original is certainly no argument that they are true.

There is no need of showing that Mr. Peirce is not just in his statement of my view of originality, by maintaining that I have advised people "think not for yourself." Confessedly he exaggerates, but in truth he misrepresents.

Mr. Peirce does not relish what I have to say on the subject, and, to pacify his mind, he does not tire of praising originality as the high-water mark of genius.

Mr. Peirce's love of originality is a nominalistic feature of his mind. A nominalist who denies the existence of universals cannot understand that everything in science must be sacrificed to truthfulness. The question, Does this idea correctly represent its respective reality? has no sense to a nominalist. The nominalist is only interested in what a thinker makes of things. The subjective conception, in his opinion, exhausts the subject. I can understand that a nominalist should be greatly pleased with originality, but a realist should not allow himself to be seduced by its charms.

Mr. Peirce's penchant for, and my distrust of, originality, have a direct influence upon our respective methods of thought. It naturally makes him bolder and me more cautious.*

* Like Mr. Peirce, Kepler had, in his days, too, thought of the possibility of making the world evolve from chance. When, in 1604, a new and brilliant fixed star suddenly appeared in Ophiuchos, he took up the problem of star-evolution. We will let Kepler tell the story in his own words as it appears in his treatise on the new star:

"Yesterday, while pondering over the problem, I was called to dinner, and my young wife served the salad. 'Do you think,' I asked her, 'if since the origin of

3. A MODERN PROCRUSTES.

There was a man in ancient Greece named Procrustes, who had two beds; one long, the other short. He used to lay his tall guests upon the short bed, and his short guests upon the long bed, cutting off the limbs of the former and stretching out the bodies of the latter, until they fitted the size of their unpleasant resting places. In the same way Mr. Peirce treats philosophical views.

There is the bed of the materialist and, as all processes to the materialist are purely mechanical, necessitarianism is stretched in the materialist's bed to mechanicalism. I plead, since ideas and feelings are not motions, that mental processes cannot be explained by the laws of motion, but can, for that reason, be none the less determined; but I plead in vain. That view of necessitarianism does not suit the bed upon which my Procrustes places me. Other views, however, are cut down without further ado because they are said to be nominalistic. Anything that does not appeal to Mr. Peirce's realistic mind is dismissed with a shrug.

I am neither a realist nor a nominalist, or rather, I am both realist and nominalist. I am convinced that to some extent both sides were right and both sides were wrong, and regard it as our duty to sift their propositions and accept the truth whether it be nominalistic or realistic.

We must follow the principle of hearing both sides, and not consider at all whether a statement agrees or disagrees with certain party principles.*

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creation, pewter platters, salad leaves, oil and vinegar, and also hard-boiled eggs had been flying in a chaotic mixture through space that *Chance* would have been able to collect them to-day in a salad?' 'Certainly not in such a good mixture as this is,' was the reply of my beautiful wife."

Kepler rejected the idea that the world could have evolved by chance.

* The philosophical articles of the *Century Dictionary* do not seem to be free of party spirit. An extraordinary amount of praise is given to the mediæval realists which, considering the vagaries of their propositions, they do not deserve. On the other hand, the blame for the discredit into which scholasticism has fallen is heaped upon the nominalists.

4. OCCAM'S RAZOR.

The most brilliant disciple of Duns Scotus was William of Occam, whose fame almost rivalled that of his master. Occam became an adversary of realism ; he became a nominalist, and after him was named a method known as Occam's razor, especially useful to nominalists in their warfare against realists.

Occam's razor is expressed in the sentence : "*Entia non sunt multiplicanda præter necessitatem,*" which means : Only in cases of extremest necessity are we allowed to assume the existence of hypothetical facts. If assumed facts are not absolutely indispensable, cut them off !

Occam's razor was invented for a special purpose, that of cutting off the realistic hypostatisation of abstract ideas.

I do not know which is more startling, that a realist in name, such as Mr. Peirce, should use a weapon forged by nominalists against realism, or that he whom in other respects we found in such a close contact with nominalistic methods, should not understand how to handle a nominalistic weapon.

Mr. Peirce censures me for making the statement that the formal is subjective as well as objective. This, he says, is cut off by Occam's razor.

The formal is subjective, for our sensation is possessed of form and our mind is in possession of formal thought. It is objective, for reality is not void of form and the things are such as they are by virtue of their peculiar shape.

The proposition that the formal is objective and subjective at the same time is as little cut off by Occam's razor as, for instance, the proposition that there is air inside and outside of us, viz. in our lungs and in the surrounding atmosphere.

Mr. Peirce's usage of the beds of Procrustes is cruel, but his usage of Occam's razor is inconsiderate. He should be careful in handling such a sharp knife, lest he do himself harm.

Mr. Peirce uses Occam's razor to cut off statements and facts which make his pet theories dispensable; but he forgets that Oc-

cam's razor cuts off ideas only, and when it comes in contact with facts its edge is turned.

Occam's razor is an excellent instrument to dispose of such hypotheses as absolute chance, for it declares that if their assumption is not quite indispensable, we must cut them off.

Now it either is or is not a fact that the formal is objective and subjective at once. It cannot be untrue in my philosophy while it is true in Mr. Peirce's system. My proposition of the formal being at once objective and subjective is, according to Mr. Peirce, "cut off by Occam's razor." "But," adds he, "when synechism has united the two worlds this view gains new life." So long as I say so, it is wrong; but should I adopt Mr. Peirce's system, it will pass as right.

5. THE APPLICATION OF LEARNING.

Philosophers should make it a rule not to encumber their thoughts unnecessarily with learning. The great problems of philosophy are, in my opinion, much simpler than they are generally supposed to be. The art mainly consists in stating them in the simplest possible manner.

It is indispensable for a philosopher to be familiar, at least in a general way, with all the most important sciences, especially with psychology, physiology, logic, physics, mathematics, and mechanics. But he should not for that reason introduce any more than he can help their complicated details into his expositions.

Every specialist is inclined to look at things through the spectacles of his own speciality. But the philosopher who takes a higher standpoint should be on his guard. He should always endeavor to simplify matters and avoid introducing into philosophy issues which belong to a special field, and derive their peculiarities from special conditions. To confound the methods of the various sciences, or to generalise without sufficient discrimination, will throw everything into confusion.

Mr. Peirce, as we well know, has greatly distinguished himself in logic by valuable discoveries and independent investigations. We have repeatedly taken occasion to pronounce unreservedly our admiration of his achievements in this field. But we cannot ap-

prove of his application of certain methods of his speciality to philosophy in general. Mr. Peirce is inclined to look at the world through the spectacles of that new and extremely specialised branch of logic which he is at present about to invent.

One hindrance to properly appreciating his doctrines, says Mr. Peirce, lies in my "laboring under the great disadvantage of not understanding the logic of relatives," which, he adds (p. 533):

"Is a subject I have been studying for a great many years, and I feel and know that I have an important report that I ought to make upon it. This branch of logic is, however, so abstruse that I have never been able to find the leisure to translate my conclusions into a form in which their significance would be manifest even to powerful thinkers, whose thoughts had not long been turned in that direction.'

I shall be glad to sit at Mr. Peirce's feet as an attentive student, as soon as he has worked out his logic of relatives, or any other subject. But I cannot now accept any of his theories on the credit of some half-developed science, be it ever so profound or intricate, until I see plainly its connection with the present issues.

Mr. Peirce trusts that his favorite ideas will find support in his peculiar conception of the logic of relatives. Judging from the quiddities which he now so confidently propounds as weighty arguments, we cannot share his sanguine hopes. His arguments, to be derived from the logic of relatives, are like promises to pay out of the returns of a gold-mine, just discovered and boomed by the owners. There may be gold in the mine, but I do not as yet take any stock in it.

Mr. Peirce promises to prove by the logic of relatives what, if it were true, he should be able to demonstrate in plain language.

I have an idea that the logic of relatives can be worked out into as clear a science as is mathematics or algebra. But what shall we say when told that the logic of relatives is really abstruse, and that he who labors under the disadvantage of not understanding this abstruse science is not prepared to grasp Mr. Peirce's philosophy? The abstrusity, in my mind, counts against Mr. Peirce's philosophy, as much as against his logic of relatives.

In my childhood I was much plagued with Latin, but as soon as I had acquired a smattering of it, I began to talk Latin to the

servants, and when they did not understand me I thought that they were "laboring under the great disadvantage" of not speaking Latin. Since then I have learned to translate my Latin into the language of the people with whom I have to deal.

Mr. Peirce seems to rely on his learning in proportion to its abstrusity; he likes to walk on stilts.

Mr. Peirce is scholarly to excess. He has a special talent of rendering issues involved. Not even his references to my articles in *The Monist* are made directly by quoting the pages on which they appear. That method would be too common. He invents a ponderous system, necessitating the reader to look twice when he wishes to find a passage,—a scheme which is original and very dignified in appearance, but makes quotation unnecessarily complicated.

Learning is a virtue, but even virtues should be used with discretion.

6. THE PRINCIPLE OF POSITIVISM.

Says Mr. Peirce in confirmation of Whewell (p. 546):

"Progress in science depends upon the observation of the right facts by minds *furnished with appropriate ideas.*"

To rely on the observation of facts is, in my opinion, a principle of positivism. That facts must be observed "by minds furnished with appropriate ideas" is undeniable, but ideas, in order to be appropriate, must be true; they must be representations of facts.

Because he relies on facts I have characterised Mr. Peirce's method as positivistic. But he indignantly repudiates "the charge" as "totally unfounded."

Positivism (which I have always carefully distinguished from Comtism, the latter being a special kind of positivism*) is not a peculiar philosophy, but a most important principle of science.

Mr. Peirce seems to use the term positivism in a different sense

* I said in *Fundamental Problems*, page 142, "The introduction of the word positivism into philosophy is the merit of M. Auguste Comte. Although we cannot accept much of M. Comte's conception of positivism we gratefully adopt the name." There are plenty of other passages in which my usage of the term positivism, as distinguished from the French positivism, is set forth, so that there could be little danger of being misunderstood.

from that in which I use it. Be it so. I shall not nominalistically quarrel about words so long as there are more urgent subjects under discussion. Noticing that Mr. Peirce does not state that all ideas should be ultimately reducible to facts, he is to be acquitted.

7. LOPPING OFF THE ABSOLUTE.

Mr. Peirce thinks that an agreement between us could be arrived at. He says (p. 545):

"Dr. Carus's philosophy would, in its general features, offer no violent opposition to my opinions" (§ 16).

But the condition is (p. 545):

"To lop off the heads of all absolute propositions whose subject is not the Absolute."

As a matter of fact I have lopped off all absolutes. If Mr. Peirce were more familiar with my views he would have known that. Thus, on my part, I had done all I could to come to an agreement with him long before he asked me to do it. But I fear that having also lopped off the Absolute itself, I did too much of a good thing, for Mr. Peirce carefully records his opposition to all philosophies which deny the reality of the Absolute. (See § 18.)

I wish to improve this occasion for conciliation, by turning the tables. Mr. Peirce's views would, upon the whole, offer no violent opposition to my opinions if he would only consent to lop off the absolute-property of his absolute chance. I would even swallow his Absolute if he would promise to designate by that name some real quality of the world, or the world itself as a whole, or something that is thinkable without making one's head swim.*

* My main objection to the term Absolute is to forestall any hypostatising of a vague abstract notion which can only serve the purpose of mystification. I suffer the term Absolute in a loose sense when it is understood that it is used loosely. I do not say, as Mr. Peirce seems to believe, "absolutely universal" or "absolutely necessary." The words universal and necessary are sufficiently significant to me without any additional emphasis.

Reality is relative throughout. Absolute existences are, if the term is taken seriously, nonentities; and the expression "The Absolute" for the whole of existence or for those features of existence which are universal and necessary is, to say the least, misleading. These are my reasons for rejecting the Absolute as a philosophical term. There is, of course, no objection to the term in chemistry, physics, mathematics, and other sciences, where it has acquired technical meanings.

Every predication of absolute, changes a real and useful idea into its caricature. To say that a complicated calculation is "absolutely true," that is, true without stipulating the condition that the methods are right, and that the execution is made without any mistake, is ridiculous; and thus the phrase "in a Pickwickian sense" (which we gratefully borrow from Mr. Peirce) would always form a drastic but adequate substitute for the term absolute. "Absolutely true" is "true in a Pickwickian sense" only. There are no absolute truths which are in this sense unconditionally true. In the same way, "absolute chance" is different from that real chance known to us in experience and instanced by the throw of the dice. Absolute chance is "chance in a Pickwickian sense."

Strange Mr. Peirce speaks of real chance when he means an imaginary absolute chance. He apparently uses the word "real" in this connection not to denote something that is a fact of experience but to express the idea of its being perfect or complete. Thus we may speak of a "real" perpetual motion, stating at the same time that it is neither real nor realisable.

8. THE THEORY OF PROBABLE INFERENCE.

Mr. Peirce applies his theory of probable inference to everything; also to those cases which are unequivocally determined. He granted in a private conversation that $2 \times 2 = 4$ admits of no exception. But of other purely formal statements which are in the same predicament, for instance, that the sum of the angles of a triangle in a plane measures 180°, he states as probable that they are either somewhat less or somewhat more than 180°, adding, "that they are exactly that amount is what nobody can ever be justified in concluding." To determine the sum of the angles of a plane triangle by measuring the parallaxes of stars rests upon a fundamental misconception of the principles of formal sciences. It would be consistent for Mr. Peirce to say, that $2 \times 2 = 4$ is true only according to the definitions or axioms of arithmetic. But in order to know whether $2 \times 2 = 4$ in reality, we ought to apply the theory of probable inference. Until we had verified the statement $2 \times 2 = 4$ by applying this formula to the farthest solar systems, we should not be justified

in concluding that it is exactly true. The theory of probable inferences is supposed to help us out of this perplexity, "and within another century our grandchildren will surely know whether the three angles of a triangle are greater or less than 180°."*

There is always danger in the application of abstract ratiocination; and the theory of probable inference forms no exception to the rule. On the contrary, it is especially liable to lead one astray. There is the case of the doctor who said to his patient: "I am sure you will be cured, for I had ninety-nine patients who died during the operation, and statistics prove beyond doubt that one among a hundred will survive it. You are the hundredth."

The theory of probable inferences is often misapplied, but can it be worse misapplied than by introducing it into the province of that which is certain? There is no sense in applying the theory of probabilities to what is certain. We may doubt whether the rays of light travel in exactly straight lines, but we cannot doubt

* Mr. Peirce correctly says that the axioms of geometry are now exploded. This, however, does not overthrow the reliability of formal mathematics; on the contrary, it places it on a safer basis than that of unprovable assumptions, which must be taken for granted.

We look upon the whole system of geometry as a *product of mental operations*. We perform some operations and note what their products are. We do something and mind the consequences of what we do. The problem of modern geometry is to invent a method by which we can construct in the simplest manner possible a straight line and a plane. Euclid still presupposes the existence of the plane and assumes it to be such that parallel lines do not meet. When we are able to construct the plane of Euclidean geometry, we can dispense with the axiom of parallels, for, in that case, the plane will possess the qualities it has by construction. We can very well execute other constructions in which parallel lines possess other qualities, and we shall on the basis of such an altered plan of operation be able to produce entirely different systems of geometry.

We must distinguish between the space of our mathematicians and real space. Experience teaches us that real space has three dimensions which means that from a given point every other point is determinable by three magnitudes. We might doubt (although I think there is little occasion to do so) whether the real space of our experience is truly three-dimensional, but we cannot doubt that the truths developed in the one-dimensional system of numbers, in the two-dimensional system of plane geometry, in the three-dimensional system of solid geometry, and also in *n*-dimensional systems each in their respective domain are perfectly reliable, for they are unequivocally determined, they are *eindeutig bestimmt*. There is no application of the theory of probabilities in a field where the products are not due to chance but result with certainty.

the straightness of lines in plane geometry. We cannot doubt that all the radii in a circle are equal, or that the sum of the angles of a Euclidean triangle are 180°.

9. ZWEIDEUTIG BESTIMMT.

Mr. Peirce very kindly informs me that the term *eindeutig bestimmt* is a translation of a French phrase. Very well, I do not deny it. I know very well that the phrase has a long history, but I do not consider myself bound to present the whole pedigree of every term I use.

Does Mr. Peirce perhaps suppose that the French phrase is the original? If we have to go back to the original beginning at all, why does he not tell us that the French *univoque* is a translation from the mediæval Latin *univoce*, which was coined and used by the schoolmen in opposition to *æquivoce*. Neither the term *eindeutig*, as Mr. Peirce asserts, nor its scholastic original *univoce*, is an exclusively mathematical expression.

Although the term *eindeutig* is a translation of the French *univoque*, there is after all a great difference between the French term and the German term, and I have a good reason to prefer the German expression. The French term is nominalistic or even vocalistic, the German one is realistic. *Univoque* and *univocal* mean that there is only one name or one *vox*, while *eindeutig* lays no stress on the name but on the meaning of the name, denoting that which admits of but one interpretation. This is a sufficient reason for me to prefer it, and it ought to appeal to Mr. Peirce's realistic mind.*

Mr. Peirce, maintaining that *eindeutig bestimmt* is only a mathematical term, adduces two equations, each one of which, taken singly, admits, he says, of two possible determinations.† Mr. Peirce uses these equations as an argument against my application of the term,

* I wonder why the *Century Dictionary* does not mention the scholastic usage of the word *univocus* as the root of univocal. Similarly we are not told that the word *incompossibilitas* is an invention of the schoolmen. Duns Scotus, Mr. Peirce's favorite philosopher, uses the terms *univoce* and *incompossibilitas* freely.

† We accept in this argument Mr. Peirce's solutions, which, however, are his own. A simpler example would have been more appropriate.

adding, sarcastically: "This shows how much that argument amounts to." But his example proves at best only that there are incomplete determinations; some problems allow of several solutions. In a German township in which blue hussars are garrisoned, children used to propose to another this profound problem: "It lies under a plum-tree and is blue; what is it?" If the child questioned argues, "It is a plum," he is corrected, "No, it is a hussar." But if he argues, "It is a hussar," he is corrected, "No, it is a plum." So he has no chance of guessing right. The result of Mr. Peirce's first equation, which may be either 11·477 or 11·523, is like the conundrum of the plum-tree: it amounts to the same, viz. to nothing, and proves only that there are determinations which are *zweideutig bestimmt*.

10. EXPLANATION.

The differences of method become very serious when we disagree on the very meaning of "explanation" itself. How can two debaters accept or reject one another's arguments, if their ideas of explanation are radically different?

Mr. Peirce's definition of the term "explanation" appears to me very unsatisfactory. He says (p. 57):

> "I cannot admit that explanation is description of the fact explained. It is true that in the setting forth of some explanations it is convenient to restate the fact explained so as to set it under another aspect, but even in these cases the statement of *other* facts is essential. (!) In all cases it is *other facts*, (!) usually hypothetical, which constitute the explanation; (!) and the process of explaining is a process by which from those other facts the fact to be explained is shown to follow as a consequence by virtue of a general principle or otherwise."
>
> "To explain a fact is to show that it is a necessary or at least a probable result from another fact (!) known or supposed."

My definition of "explanation," as a description in which the process described is recognised as a transformation is sneered at. Says Mr. Peirce (p. 558):

> "A magician transforms a watch into a dove. Recognise it as a transformation and the trick is explained, is it? This is delightfully facile."

Indeed, the magician's trick is explained as soon as we know all the changes that have taken place. Take the whole number of

objects handled by the magician, those which he shows and those which he conceals. Let us observe how he hides the watch and how he produces the dove, and the trick is explained. Is it not?

Explanation is, as the word suggests, a making plain, so that we can look over the whole field before us, and leave nothing hidden from sight. This whole field, the survey of which is needed for the recognition of the transformation, is called the system of the explanation. After we have seen how the changes take place, and after we have described in exact formulas their modes of action, our desire for explanation is completely satisfied.

The instances adduced by Mr. Peirce prove plainly that his objections cannot be maintained. Every one of them is an instance of transformation (with the exception of the emerald vest, which, however, is not stated with sufficient completeness). Take, for instance, the following example adduced by Mr. Peirce (p. 557):

"A 'special process of nature,' calling for explanation, is the circumstance that the planet Mars, while moving in a general way from west to east among the fixed stars, yet retrogrades a part of the time, so as to describe loops in the heavens. The explanation is, that Mars revolves in one approximate circle and we in another."

Can any one deny that this explanation is a description? We draw the two orbits as correctly as possible for the required demonstration and combine the points representing the earth with those representing Mars at their successive positions. Considering the fact that we do not perceive the motion of the earth, we have to construct a diagram in which the directions of these lines are described as viewed from a stationary point. This is a description of changes that take place. It is a portrayal of the transpositions of two bodies, and the appearance which the change of this relation presents to one of them.

Mr. Peirce has neither the grace nor good-will to understand my proposition, that *explanation is always a tracing of form.* He says (p. 558):

"Forms may indulge in whatever eccentricities they please, in the world of dreams, without responsibility."

In the world of dreams, yes! But not in the world of reality.

And even the irresponsible eccentricities of dreams take place according to law.

Feeling that he mistakes my position, Mr. Peirce adds:

"Should Dr. Carus reply that I mistake his meaning, that it is only 'being in general' (§ 66), that he holds unaccountable, I reply that this is simply expressing scepticism as to the possibility and need of philosophy." (P. 558.)

Of course, I mean "being in general." As to the scepticism imputed to me, I answer, that any attempt at explaining how matter and energy, which I take to be eternal, came into being, is a wrongly formulated problem. Mr. Peirce might as well call me a sceptic, because I recognise that we cannot square the circle. (Compare "Fundamental Problems," 2d ed., pp. 283–285 and 291.)

Mr. Peirce's gravest mistake is his belief that

"In all cases it is *other facts* which constitute the explanation." (P. 557.)

The practical application of this mistake becomes fatal to his philosophy.

It is by no means necessary to pass beyond that system of facts which contains the phenomenon to be explained. We must, as a matter of course, keep completing the facts of a phenomenon until we have acquired a survey of what we call the whole system of the facts, but we have never to resort to other facts.

We are confronted every day with hundreds of facts of which we never see the whole system to which they belong, but we readily supply these deficiencies from the stock of our experience. We refer the unknown to the known. The single case under observation is referred to something with which we are familiar. Those systems of explanation which are known to us serve as patterns for others that are only partially known, and we fill out, with their assistance, the gaps of our observation.

The readiness and reliability of our explanation thus depends upon the stock of knowledge we have. The more we know, the easier shall we conquer the unknown; the more incomplete our knowledge is, the greater the number of hypothetical facts that will have to be introduced; and this always weakens the reliability of our explanations. Hypothetical facts should be introduced only in

cases of urgent necessity. However, if they are admitted at all, they have to be thought of as parts of the system under investigation, for they have been invented only because we are compelled to assume that without them it would be incomplete.

Mr. Peirce adduces the following example to prove that "other facts" are required in an explanation:

"It has been stated that a warm spring in Europe is usually followed by a cool autumn, and the explanation has been offered that so many more icebergs than usual are liberated during a warm spring, that they subsequently lower sensibly the temperature of Europe. I care little whether the fact and the explanation are correct or no. The case illustrates, at any rate, my point that an explanation is a special fact, supposed or known, from which the fact to be explained follows as a consequence." (P. 557.)

When, as in this instance, we recognise that one fact is the necessary result of another fact, we view them both as parts of one set or system of facts in which a transformation is taking place, and, unless we see the connection of the two facts as constituting one process of transformation, we cannot say that the problem is explained. When we observe changes which are the results of transformations taking place beyond the horizon of our knowledge, we are, as a matter of course, unable to give an explanation.

Mr. Peirce had perhaps in mind a special and more complex kind of explanation, which we define as "comprehension." He says (p. 557):

"The fact to be explained is shown to follow as a consequence, by virtue of a general principle or otherwise."

Take as an instance the law of gravitation. There are the facts of falling stones and the motions of celestial bodies. Both sets of facts are explained, according to Mr. Peirce, "by virtue of a general principle," i. e. gravitation, while we say, both sets of facts are comprehended under a common formula. Mr. Peirce's conception of "explanation" rests on the antiquated view that gravitation is a principle behind the gravitating masses which compels the stone to fall. Gravitation, however, is not "another fact" foreign to the facts under consideration. It is not a principle called in from the outside. On the contrary, it is the essence and extract of the very facts that are to be explained.

Principles which have not been derived either from the facts to be explained, or from the additional facts which belong to their system, do not and cannot explain the phenomena.

* * *

Comprehension is, as it were, an explanation of a higher degree. The term means a grasping together, and it actually consists in viewing two or several facts in such a way as to recognisè their common features. Comprehension is a reduction of our patterns of explanation ; it unites two or several of them in one formula.

For instance, it has been observed that certain objects float in water while others sink to the bottom. The observations do not seem to agree, they present two incoherent facts. When we find out that the weight of a floating body is equal to the weight of water which it displaces, we understand at once why bodies whose specific gravity is greater than water sink while those of a lighter specific gravity float. Comprehension, in this as in every other case, is the description of a process which comprises all the facts that belong to a special class in a common formula. The description must be applicable to all single cases however different they may be.

This conception of comprehension has a great advantage over Mr. Peirce's view. While he has to bring in some "other fact" from the outside, we need not introduce any foreign element. Comprehension, as we understand it, can rise from the statement of particular facts to more and more general formulations, until finally we arrive at universal laws. All the laws thus formulated to satisfy our cravings for comprehension, are found to belong to one great system of laws, and our scientists are constantly engaged not only in widening the range of our experience by new discoveries, but also in revising our statements of the uniformities of nature and, where they appear to be in collision, in bringing them into harmony.

This conception of comprehension is monistic, Mr. Peirce's is dualistic. We need not, in order to explain the facts of existence, go beyond them into a supernatural realm. Mr. Peirce must go outside of the world into non-existence when he attempts to understand the world by the principles of his philosophy. It is very doubtful whether explanations, the "essential" nature of which is to consist

of "other facts usually hypothetical," will be satisfactory to anybody except himself.

Otherness makes any fact unfit to serve as a factor of an explanation and indeed I cannot think of any instance, real or imaginary, in which the explanatory facts, be they real or hypothetical, do not form parts of the system under consideration.

There is only one instance to which Mr. Peirce's method of explanation has been applied, and I am under the impression that it has been invented solely for this purpose. Mr. Peirce's philosophy is too original to be explained by the usual methods; it must have an original method of its own. In order to explain "law" Mr. Peirce calls in "chance." His explanation must be an "other fact" and the only fact different from law is not-law, lawlessness, or absolute chance. According to my idea of explanation, law can never be explained by chance. According to Mr. Peirce, it is the only possible thing that can be called in as that "*other* fact" which is supposed to be the essential constituent of an explanation.

If Mr. Peirce's method of explanation were sound, we should have to explain order from chaos, possibility from impossibility, and sense from nonsense.

II. MR. PEIRCE'S PHILOSOPHY.

Mr. Peirce's constant references to scholastic philosophy remind me of happy years long past when I was extremely interested in the theories of such men as Thomas Aquinas, Duns Scotus, Occam, Abelard, Tauler, and others. Together with my chum, now a sober Professor of physics at a German University, I freely indulged in the construction of various world-theories, which, alas! were quickly overthrown one after another by the slightest puff of wind. I have not lost my interest in the schoolmen, but it is considerably weakened.

Mr. Peirce's repeated praise of scholastic realism and his condemnation of any theory that he brands as nominalistic, seems to me like the method of some of our politicians who, eager to revive toryism, should censure all evils of the politics of to-day as whiggish. This comparison is not exaggerated, for there are a few Hamiltonians who

miss the refining influence of an aristocratic class and regret that the historical tradition of toryism has been so completely broken. I would not deny that there is some truth in it, and there is some truth, too, in mediæval realism, which has been neglected by the, first violently suppressed and then triumphant, nominalism. But in reviving realism the Scotists should be very careful to avoid a resurrection of its errors.

1. DUNS SCOTUS AS A PHILOSOPHICAL PATRON SAINT.

Johannes Duns Scotus, a Franciscan, honored since his sucessful defense of the Blessed Virgin's Immaculate Conception by the title Doctor Subtilis, and the very same man after whom, on account of the narrowness of his later disciples during the time of the Reformation, a blockhead is to-day called a dunce, was one of the most characteristic figures of scholastic philosophy. He lived at the end of the thirteenth century when the authority of the philosophy of Thomas Aquinas who had died March 7th, 1274, was all but universally recognised. Scotus appeared as the most powerful opponent of Thomas. Ingenious, original, bold, and buoyant in his attacks he had a short but brilliant career and died comparatively young at Cologne, in November, 1308.

While Thomas, surnamed Dr. Universalis, or Dr. Angelicus, is regarded by his order, the Dominicans, as the greatest authority in philosophical matters, Scotus succeeded in impressing his mode of thought upon the Franciscans; yet Thomas is universally regarded in the Roman church and also among Protestant theologians as the more orthodox Christian.

Almost all the ideas of Scotus were set forth in opposition to the views of others and mainly of Thomas. Thomas was a determinist, Scotus an outspoken indeterminist. Thomas says that man's action is necessarily determined by what he thinks is best. Scotus avers that man thinks in a certain way because he wills in a certain way. Man's ideas are fashioned to suit his character. His motto is, "*voluntas superior est intellectu*" and his idea of will is identified with the indetermined arbitrariness of a perfect *liberum arbitrium*. According to Thomas, God commands us to do the good because it

is good. Scotus calls good that which God commands simply because God commands it. The will of God, like the will of man is, in Scotus's opinion, undetermined, it is arbitrary. Thus God created the world not because his will was determined by some motive, but because it so pleased him; and Christ's passion and death were not really an atonement; they simply were accepted as such by God.

Without entering into this controversy of *anno olim* we might say that we side neither with Thomas nor with Scotus, but would modify the statement of the former by the criticism of the latter. Thomas goes too far when he says that whatever is recognised as the best will of necessity be done. He overlooks the power of passions. Thomas's statement would be right, if every passion were regarded as a will which has its own and independent but mistaken ideas about good. A soul whose passions are more powerful than rational considerations will necessarily be inclined to obey its irrational impulses. There is something in Scotus's criticism, but his view is no improvement. In speaking of will as superior to the intellect, did he ever ask himself the question, What his own will would be independent of his intellect? Further, when God is said to command the good because it is good, Thomas separates in a logical consideration two ideas which are identical. Scotus is right in defining good as the will of God. From our standpoint we should say, the will of God, viz., the moral order of the universe, is of a definite kind which can be ascertained by experience. To speak of the will of God as good is an anthropomorphic expression. Good is that which agrees with the will of God; bad, that which opposes it. Suppose the moral order of the universe were different, goodness and badness would change with it.

We have sketched the views of Scotus only to show the points of contact between him and Mr. Peirce. Mr. Peirce is also an outspoken indeterminist. He identifies feeling with chance, and his free will is a *liberum arbitrium*. Mr. Peirce, like Scotus, also separates theology, and, with it, religion, from philosophy.* Scotus

* The belief in a duality of truth appears quite rational from the dualistic standpoint of the middle ages, and the arguments of Scotus are cleverly devised, being based upon the supposition that the fall of man had changed the entire order of the

ridicules those who confound both, clearly indicating that he is aiming at Thomas, to whose fervent faith their conciliation was a matter of momentous and all important consequence. Scotus goes so far as to aver that something might be true in philosophy which is wrong in theology (see Ed. "Wadding" Fol. 4, p. 848)—a statement that to an honest searcher for truth must almost appear as frivolous.*

How much more imbued with true religiosity was his great namesake John Scotus Erigena the venerable founder of scholasticism when saying: "*Non est alia philosophia, i. e. sapientiae studium, et alia religio.*"

2. MR PEIRCE'S ORIGINAL THEORIES.

Mr. Peirce as a controversalist and critic is like Scotus, brilliant, versatile, and powerful. But he is more; he is also constructive.

Mr. Peirce's style of architecture reminds us of neo-Platonism, and this is quite in harmony with Scotism, for Scotus, through Avicebron, derived many of his ideas from the Neo-Platonists. Mr. Peirce proposes a modern view of emanation, which starts the world from that βυθος of nothingness which at the same time is the womb of all existence. The primeval state of being, says Mr. Peirce, "Was mere nothing from a physical aspect," but, if it was not really nothing, what, then, was it?

It was chance.

Here lies the essential difference between Mr. Peirce and the neo-Platonists. The neo-Platonists (whose speculations, if they are treated not as philosophy, but as poetical effusions, are very profound and thoughtful) look to the Logos, or world-reason, as the beginning of the world emanation, while Mr. Peirce shows a certain contempt

world, so that the laws of nature prior to the Fall were different to those which obtain now.

* Duns Scotus was a very zealous advocate of ecclesiastical supremacy, even advising, for instance, the prosecution of the Jews in order to convert them. It is a strange irony of fate that the author of the *Fons vitæ*, upon whose authority Scotus so largely depends and from whom he derived some of his most important ideas was an Israelite. Scotus did not know that Avicebron was a pseudonym of the Spanish Jew Salomon ben Gebirol.

for reason. To the neo-Platonist, reasons *are* explanations, while to our modern Scotist, reasons explain nothing. He says:

"Reasons explain nothing, except upon some theistic hypothesis which may be pardoned to the yearning heart of man, but must be doubtful in the eyes of philosophy . . . ." (P. 567.)

Mr. Peirce goes so far as to speak of "the dullness of ratiocination's self."

Mr. Peirce's gospel would deviate in the very first verse from that of St. John, for it would read

Ἐν ἀρχῇ ἦν ἡ τυχή.—In the Beginning was Chance!

And this chance which was in the beginning actually is, to Mr. Peirce, God, a personal God, an anthropomorphic deity endowed with conciousness. He says:

"That primeval chaos in which there was no regularity was mere nothing from a physical aspect. Yet it was not a blank zero; for there was an intensity of consciousness there, in comparison with which all that we ever feel is but as the struggling of a molecule or two to throw off a little of the force of law to an endless and innumerable diversity of chance utterly unlimited." (*The Monist*, Vol. III, No. 1, p. 19.)

And in another passage he says of chance:

"That it is a being living and conscious is what all the dullness that belongs to ratiocination's self can scarce muster hardihood to deny." (P. 560.)

Mr. Peirce's argument that all the dullness that belongs to ratiocination's self can scarcely muster hardihood to deny his proposition, sounds strange in the mouth of a scientist. But it is not strange; for I have found that enthusiastic defenders of improbable theories always fill the holes of their argumentation with abuse of those who dare to discover these holes. Call a person who doubts the truth of your statements dull, and you will frighten many a weak mind into a patient acceptance of your view.

We may rest assured that whenever a philosopher scolds he is at his wit's end. For why should he lose patience if he can prove his proposition? Thus diatribes are always symptoms that there is some flaw in one's logic and the louder one chides the sorer is the spot.

Mr. Peirce is serious in the statement that chance is a conscious being. He actually identifies chance and feeling. He says:

"Chance is but the outward aspect of that which within itself is feeling."

The primordial chance, the existence of which, according to Mr. Peirce, "calls for no explanation," has "a primordial habit-taking tendency." Whence this tendency gets into the universe of absolute chance, Mr. Peirce is unable to disclose. The deviations from the mechanical order in the present course of things, which, by the by, are by no means proved, suggest to him and justify, in his opinion, this assumption. Thus, assumes he, primordial chance ceased to be chance; it changed by a gradual habit-taking into regularities. Consciousness ceased to be consciousness and became crystallised into natural laws. Mind ceased to be an arbitrary sporting, and by becoming effete it begot, through a summation of minute effects, this material universe of ours. Accordingly, real existence or thingness consists merely in the regularities thus produced, and "physical events are but the degraded . . . forms of psychical events."

This is in brief Mr. Peirce's cosmogony, which, as the prophet of Tychism, he reveals to us in axiomatic aphorisms.

By gradual habit-taking, Mr. Peirce declares (*The Monist*, Vol. I, No. 2, p. 176), mind will at last be "crystallised in the infinitely distant future." This rather sad outlook is, in another passage, modified by a counter-oracle, which announces that "an element of pure chance survives." Why, he does not say. Irregularities, not being entirely suppressed, can increase again, and as such they are "undeveloped forms of psychical events." Says Mr. Peirce (*The Monist*, Vol. III, No. 1, p. 18):

"There are almost insensible fortuitous departures from regularity; these will produce, in general, equally minute effects. . . . Protoplasm is in an excessively unstable condition. . . . In the protoplasm these habits are to some slight extent broken up, so that, according to the law of mind, . . . feeling becomes intensified.

"This breaking up of habit and renewed fortuitous spontaneity will, according to the law of mind, be accompanied by an intensification of feeling."

This is the gist of Mr. Peirce's mental philosophy, which proclaims that "consciousness is not to be reinstated without tychism." The reappearance of chance is said to explain the origin of mind!

Our conception of mind is different. We see mind develop out of sentiency by the recognition of the regularities of the surrounding world. Reason is almost a synonym of man's ability to form generalisations, of his having and operating with concepts, of his thinking ideas. Not the arbitrariness of a wilful mind is the properly mental of man's soul, but his reason; and man's reason originates under the influence of the uniformities of the surrounding world, which impress themselves, in what we call experience, upon his existence. The more a creature recognises the regularities of existence, and the more its soul becomes an image of this world-order, which is the prototype of his reason, of the divine Logos, the higher it rises in the scale of evolution.

If chance, as Mr. Peirce declares, is but the outward aspect of that which within is feeling, we should henceforth have to look upon the roulette and dice as sentient beings.

3 THE FOUR POSITIVE ARGUMENTS OF TYCHISM INSUFFICIENT.

Mr. Peirce adduces four positive arguments for believing in absolute chance. They are: (1) the prevalence of growth; (2) the variety of the universe; (3) the necessity of explaining law; and (4) the existence of feeling.

By growth, Mr. Peirce does not understand the growth of crystals, or trees, or organisms. That kind of growth is a mere transformation. Mr. Peirce's idea of "real" growth is "opposed to the conservation of energy." It is not an increase of the thing growing through the assimilation of substances taken from the surrounding world; it is an actual increase of energy, not a mere change; it is a growth of the universe itself. Granted the possibility of this so-called "real" growth, and we can easily explain the evolution of the world out of the tiniest beginning. But, of course, one thing has to go: either the conservation of energy or "real growth." Mr. Peirce lets go the former, I the latter.*

* I omit here a discussion as to whether or not the conservation of energy is true or not. I need not mention that the views of our physicists, such men as Helmholtz, Mach, Maxwell, Tait, and others, differ widely from Mr. Peirce's presentation of the subject. Mr. Peirce rejects the law of the conservation of energy,

The variety of the universe is, in my world-conception, sufficiently explained by the variety of forms, for form is indeed the *principium individuationis*; a doctrine, which, but for Mr. Peirce's philosophy, I should regard as almost universally accepted. Among its advocates we find also Mr. Peirce's great master, Duns Scotus, and Scotus's teacher, Avicebron. In so far as various formations are possible, (exactly as the die can show six different surfaces,) chance plays an important part in the diversification of nature, but this chance is not to be thought of as a violation of the law, but appears to be a special case only, and a true manifestation of the law under complicated conditions.

Chance and probability are not mere subjective ideas, creatures of our ignorance, playing a role simply in our limited knowledge of the world. The words signify a certain condition of objective existence.

For instance, the probability of throwing 1 with one die is 1/6. This means, the die is so constructed that it can show six different positions, one among them being 1; and these six possibilities are as real a quality of the die, as its weight or its color.

The die has six possible positions. Now I take a die and throw 3. Are we not entitled to believe that the throw was sufficiently determined by all the innumerable conditions which accompany the act? We confidently think so, and feel no need of assuming any absolute chance. Now I throw again. What is now the probability of throwing 1? We answer again, 1/6. And, lo! there it is! It came at the second throw, and we ask, was our statement of the probabilities wrong? We say, no! it was not wrong, for it remains true even now. The statement does not mean that we shall throw a 1 at each sixth throw, but that (supposing the die to be perfect) 1/6

but retains the conservation, or (as he prefers to say) perduration of matter. I waive the question, whether this is consistent, and call attention only to another, most flagrant contradiction. Mr. Peirce states that, "not only the total amount [of matter] remains constant, but all the different parts preserve their identity"; and yet he says that "matter is effete mind." Thus when mind becomes effete, the amount of matter increases; however, when the habits of matter are broken up, mind originates, and the amount of matter decreases. This, it seems, would make any perduration of matter and of the identity of its different parts impossible.

among all the possible throws will be 1, so that supposing all the possible throws realised in an infinite series of throws, the average number of 1's among them will be the one-sixth part of the whole.

The enormous importance of chance (viz., of that real chance which is no violation of the law) has been recognised since Democritus and has received a fresh illustration from the investigations of Darwin, which I need not here recapitulate.

The theory of probabilities teaches, that whatever can happen in the long course of an infinite number of events, actually will happen, and that whatever, according to the nature of things, has a greater probability, will in an infinite number of cases occur with proportionately greater frequency.

The lesson which we have to draw from this statement is, that that which we wish not to happen, should be made impossible. And this can be done, perhaps not perfectly, but approximately. According to Mr. Peirce, the evolution of mind is due to the reappearance of chance; we say that the evolution of mind is marked by man's increasing power in the restriction of chance.

The identification of chance with feeling, or even with mind, is to me an idea so grotesque, that I am inclined to regard it as a relic of gnostic speculations.

Mr. Peirce, instead of attempting to comprehend laws, as we do, seeks to trace their origin. He tries to explain their existence by growth, as if they were beings that evolve like the forms of planetary systems or the organisms of living creatures. Considering the fact that Mr. Peirce is a realist only in name, and that his philosophy is soaked with nominalistic traditions, we should say (and Mr. Peirce will pardon me that I quote the expression from him) that:

"The puzzle for him is simply the usual difficulty that plagues nominalism when it finds itself confronted with a reality which has an element of generality.'

The assumption of absolute chance might be used to account for any otherwise inexplicable event, but Mr. Peirce does not countenance this idea. He warns us to be cautious in its use, like the druggist who labels his poisons "handle with care"; "I only use chance," he says, "to give room for the development of law." Hav-

ing used absolute chance to start the world with, he dismisses it. So Fiesco discharges his negro after he has done his work : "*Der Mohr hat seine Schuldigkeit gethan, der Mohr kann gehen.*"

In my criticism of Mr. Peirce's theory I said (*The Monist*, II, p. 574):

"How little, after all, we can escape the determinism of law as being a feature of the world, will be seen from the fact that the explanation for the evolution of law is presented by Mr. Peirce as being itself a law, i. e., a formula describing a regularity supposed to obtain in facts."

Mr. Peirce replies :

"Is there no difference between a law, the essence of which is to be inviolable . . . . and *that mental law, the violation of which is so included in the essence that unless it were violated, it would cease to exist?* . . . . Thus I clearly escape the contradiction attributed to me." (P. 561.)

Mr. Peirce's escape is like the disappearance of a medium from a room without doors. He must have got out through the fourth dimension. The argument is so subtle that I cannot see it, and I feel tempted to retort in a sentence quoted from my profound adversary :

"I confess, I can find only words without ideas in the objection." (P. 561.)

Mr. Peirce speaks of law as having developed out of chance, but he himself, in fact, after a fashion, explains the origin of those laws of nature which represent its present uniformities by a law of habit-taking.

That the conservation of energy should leave no room for feeling is to me an obscure proposition. The law of the conservation of energy declares only that the sum of all energy in the world, potential as well as kinetic, remains constant. If a living and feeling being renews its waste and stores up new energy in its tissues, it must take it out of the general storehouse of nature ; it must transform it, and cannot produce it out of nothing. Why should feeling become impossible, if the conservation of energy is true?

The identification of chance with feeling is, to my mind, a vagary. It is true that feeling develops mind ; mind makes deliberation possible, and deliberation implies choice. But choice is not

chance. The choice which a man makes is determined by his character. There is more resemblance between logical identity and a pun, than between feeling and chance.

4 THE NEGATIVE ARGUMENT A LOGICAL FALLACY.

The four positive arguments for believing in absolute chance are untenable. But Mr. Peirce, knowing that he had to weather a storm of criticisms, has taken along a sheet-anchor, consisting of a negative argument, which, if it were true, would make the four positive arguments redundant.

What shall we say to the statement, that chance need not be explained? Mr. Peirce says:

> "Chance, according to me, or irregularity,—that is, the absence of any coincidence,—calls for no explanation. If *law* calls for explanation, as Dr. Carus admits it does, surely the mere absence of law calls for no further explanation than is afforded by the mere absence of any particular circumstance necessitating the result" (P. 559.)

Mr. Peirce is a great logician, but the logical arguments of his philosophy are not sound. If the absence of law, of coincidences, of regularities, did not require explanation, the scientist would (as is but right) still have to explain the uniformities of nature, but the miracle monger would have a good time; for he could tell us boldly that, according to the rules of modern logic he is not bound to give any explanation.

It is true that while everything must be explained, the absence of everything (i. e. nothing) need not be explained; but we cannot use this pattern as a schedule which can be filled out at our pleasure. The ideas "absence of," "no," "no one," and "nothing" play a part in logic analogous to that of zero in mathematics. I need hardly remind the reader of the puzzling demonstration, that since one cat has one tail more than *no* cat, and since no cat has eight tails, one cat must have nine tails. Operations with zero act like death in the realm of human conventionalities. Death makes the beggar equal to the king. Multiply any equation that is wrong with zero, and it will be correct. Operations with zero render the impossible possible.

But let us look closer at Mr. Peirce's proposition. He avers that "the mere absence of any particular circumstance necessitating the result calls for no explanation."

Should it ever happen that the absence of any particular circumstance necessitates the result, I do not see why this absence should remain unexplained. Say for instance, a certain stronghold is taken because the enemy discovers the absence of guards in a certain part of the walls. If this absence of guards be counted as an important circumstance helpful in the conquest of the citadel (and there is no reason why we should not count it as such) can we say that while the presence of guards on all other spots of the wall has to be and can be explained as an endeavor to secure the place against a *coup de main*, the mere absence of guards calls for no explanation? The absence of guards in a particular spot of the Capitol during the siege by the Gauls, was accounted for by the steepness of the place. This particular spot was regarded as safe on account of its inaccessibility. Similarly, the absence of guards in the citadel of the Messenians is explained by the idea that the Spartans would make no attack because in that particularly stormy night a cloudburst seemed to prevent all approach.

Obviously the necessity of explaining a rule, does not confer the privilege of neglecting to explain its exceptions.

It goes without saying that Mr. Peirce's argument (even if it were formally faultless) can have no force with a necessitarian. Such a one, after having explained and proved to his satisfaction that *Gesetzmässigkeit* (or regularity such as can be formulated in laws) is a characteristic feature of the universe, is not only asked to believe that there are after all exceptions to law, but is even told that according to some paragraph in Mr. Peirce's unwritten logic of relatives no further argument is needed to prove the non-existence of law. Only Mr. Peirce's extreme love of his pet theories can make him blind to such palpable fallacies. But such are the foundations of his philosophical architecture.

III. MR. PEIRCE AS A CRITIC.

A good general, who has to mask the weak points of his position, uses the strategem of making demonstrative sallies upon his enemy. Mr. Peirce, although apparently quite unconscious of the fact that his basic doctrines are untenable, instinctively imitates this maxim of warfare. His defence is mostly aggressive. Instead of replying to my arguments he endeavors to represent my views as incohesive and contradictory.

The present issue is not whether my views are tenable, but whether Mr. Peirce's are. However, I am glad to have the benefit of the searching criticism of so subtle a thinker as Mr. Peirce. Therefore, I willingly appear before his tribunal to expurgate myself of his charges.

1. THE A PRIORI AND POSITIVISM.

Mr. Peirce is greatly puzzled with my position. He quotes several statements of mine which appear to him contradictory. I said: (1) that millions of *single* experiences cannot establish a belief in necessity, (2) that necessitarianism must be founded upon the *a priori*, and (3) that the *a priori* must be founded upon experience.* To him who overlooks the here italicised word "single" this may, indeed, seem to be a vicious circle.

All knowledge begins with experience. We define experience as the effects of events upon sentient beings, and these effects are sense-impressions of certain forms and interrelations. At an advanced stage of evolution, the formal and relational are first unconsciously, as, for instance, in counting, and then consciously, with scientific deliberation, abstracted from the sensory. Systems of pure forms are constructed out of the purely formal elements, thus gained from experience by abstraction, such as our system of numbers and the logical categories. Now the laws of these forms of thought are

* That my view of the *a priori*, as Mr. Peirce claims, is "Schleiermacherian" is new to me.

applicable to all formal and relational conditions of reality. The formal and relational of reality are known to us even in those regions of the universe and in those provinces of scientific investigation which have not as yet been explored. The scientist knows them *a priori*, even before he investigates objects which he never saw before. He is acquainted with certain of their qualities, viz., with the laws of their formal and relational conditions.

Thus the *a priori*, or, as I prefer to call it, formal thought, is a product of experience, and is again applicable to experience.

Single experiences, isolated observations, innumerable particular cases cannot directly yield or reveal the laws of formal thought. So long as they remain single and isolated they will never develop into mental factors; but such is the nature of reality that the single experiences will be built up and arranged in feeling substance as systematically as, for instance, the formation of crystals or the harmonious growth of cells in organisms? When sentient creatures become conscious not only of the sensory element of their experience, but also of this system of their soul, of the formal of their psychical existence, they become rational beings; and the formal which grows with their sentiency is not an exclusive and peculiar quality of theirs; it is not purely subjective, but it has been imparted to them, piecemeal, together with the single data of their experience. It constitutes a part of their *Anschauung*; it is found in the objective world and is a general feature of reality.

Out of the formal elements of our *Anschauungen*, of the facts of experience, that organ of cognition is developed which Kant calls "pure reason."

Experience is often used to denote sense-experience only; thus Kant contrasts experience or sense-perception, which he calls *a posteriori*, with pure reason and formal thought, which he calls *a priori*. We use experience in the sense defined above, *so as to include the formal element*.

I am unable to form a clear conception of Mr. Peirce's view of the *a priori*. Those systems of formal thought which I regard as constructions he regards as products of analysis. He says, "They are results dependent upon the action of reason in the depths of our

own consciousness." He only grants that "their abstract and distinct formulation comes very late." He still holds that the *a priori* is innate.

In my conception, mathematical ideas, like that of the contrivance of logarithms, are inventions; and they are constructions as much as the invention of the steam-engine by James Watt.

There is one peculiarity about the purely formal which is not found in the sensory elements of experience. Our knowledge of the various spheres of the purely formal is of a general nature; it applies to any form of the same kind. This gives system to our formal conceptions, and enables us to make statements which are rigidly and unequivocally determined. It is this quality which makes them available as an organ of cognition when dealing with facts of experience. They furnish us with methods, schedules of reference, and plans which like blanks have to be filled out.

Science begins with the application of formal thought, viz., with counting, measuring, and classifying. Only with the assistance of the formal sciences can we master the material of the sensory data of experience; and thus it happens that the formal is the condition, not of any kind of experience, but of every systematic experience.

The formal sciences are the tools of cognition. That to which they cannot be applied remains unexplained, and this is the ultimate reason why processes of nature can be regarded as explained only when recognised as processes of transformation. Cognition is the tracing of form. We can understand a change only if it is a change of form. We cannot understand how anything real can disappear into, or originate out of, nothing. We have no explanation for any actual increase or decrease either of matter or energy. Whenever we see something entirely new we regard it as a new combination, the elements of which existed before.

If there were processes in the universe which could positively be proved not to be transformations we should be confronted with an unfathomable mystery; and it is a matter of course that we must not be duped so easily by the appearance of problems which cannot be solved at first sight. The advance of science which has resolved so many mysterious phenomena into plain instances of transformation

gives us confidence that this method is the only reliable maxim of inquiry. It has helped us so far, and it will help us in the future.

* * *

I call my views positivism, because like the French positivists and also like Locke and his school I maintain that all knowledge is to be derived from the positive facts of experience. But my positivism is not of the old kind; it is neither sensationalism nor materialism nor Comtism. It is a new positivism broadened by a study of Kantian philosophy and Kant's problem of the *a priori*; and this new positivism, I hope, deserves the attention of the thinkers of mankind.

Mr. Peirce calls it a "straddling of the question," by which he means that a man is "on both sides of the fence," and has learned so to formulate the issues, "that both parties can readily subscribe to his propositions."

2. DETERMINISM AND FATALISM.

Fatalism and determinism must not be confounded. We define determinism as that view, according to which every event is determined by its conditions. The decision of a man whose liberty is not curtailed by any compulsion, so that he can act as he pleases exactly in agreement with his character, is determined objectively by the motive and subjectively by his character. A man of a certain character in a given situation will act in a way that is perfectly determinable.

Determinism, as I take it, does not exclude free-will. Nor does it exclude such chance as is, for instance, the incidental turning up of the various faces of a die.

Determinism is the basis of science, and also of ethics as a science. If the decision of a free will were merely the result of chance, why should our teachers and preachers take so much trouble to form character?

While determinism is a sound doctrine, fatalism is a superstition. Fatalism excludes the idea of free will. We define fatalism as that view which regards the fate of a man, whatsoever he may do, as fixed. For instance, we call the orthodox Mohammedan a

fatalist; he looks at the flame without quenching it, because he argues, "if it is Allah's will that my house burn down, it will burn down, whatever I may do."

In my reply to Mr. Peirce (*The Monist*, Vol. II, p. 572) I approvingly quoted from him a passage containing the word "fate," adding that here "the word 'fate' must be understood as Mr. Peirce understands it." In spite of this warning, Mr. Peirce employs this quotation made from *his* writings as if it were mine, and calls attention to the inconsistency involved in the different application of the word. This charge of inconsistency is neither judicious nor fair!

We define "necessary" as "that which is determined."

Determined means describable. Necessity is that feature of things which makes it possible that we can, in proportion to our knowledge, describe beforehand or predict the course of events.

Kant's definition of "necessary," as given in his "Critique of Pure Reason," is narrower. He says:

"That the coherence of which with the real is determined according to universal conditions of experience is necessary, or exists necessarily."

This means in our phraseology, "that feature of the real which is determined by the laws of form."

The word "determinism" has been inappropriately used in the sense of fatalism, in which sense it has to be condemned as a superstition. The term is needed, however, to denote a basic principle of great value. "Determinism," if used in the sense which the word literally indicates, means "that view which regards all events as determined by its conditions." Determinism does not mean that everything is decreed by some fate, that some Deity or other power has determined the course of events. It means that definite conditions produce definite results, and that the results can be ascertained and described, if *all* the conditions are known.

Fatalism is a peculiar kind of determinism, and, indeed, an obviously erroneous one. Fatalism rests upon a dualistic conception, regarding necessity as a foreign force residing outside and above things and compelling them to act in a special way. It is the Moira of the ancients and the Kismet of the Mohammedans. The monistic view knows nothing of a foreign force or supermundane *fatum* en-

acting a special course of affairs. Necessity, in the monistic conception, simply denotes the determinedness of results by its conditions; it signifies that *Gesetzmässigkeit*, or regularity according to law, is a feature of reality. We need not repeat again that the monistic view of determinism excludes neither chance nor free-will. It only excludes "absolute" chance and that indeterminable arbitrariness which is sometimes said to be free-will.

If events were not determined, if under the very same conditions the same causes could bring about different results, so that no regularities formulable in laws existed, the world would be a chaos and no cosmos, absolute chance would prevail, and science would be impossible.

Mr. Peirce not only confounds fate and necessity, but he also identifies them with resistance, and with reality. My idea of necessity has as little to do with the experience of reaction as, for instance, with the idea of density, or with pleasure and pain. To confound such heterogeneous concepts must be productive of confusion. No wonder that Mr. Peirce makes the confession that these ideas seem to him "of a mixed nature."

That my presentation of the case of Determinism *versus* Free-will results in "a doctrine to which the advocates of free-will will generally subscribe as readily as their opponents," is used as a reproach; but I do not take it as such, for my intention is not to side with one party, but to bring out the truth of both views.

3. NATURAL LAWS, DESCRIPTIONS.

Mr. Peirce makes the following allegation of inconsistency. He says of me:

> "The declaration (§ 198) that 'natural laws are simply a description of nature as nature is,' and that 'the facts of nature express the character of nature,' are nominalistic. But in another place (107-116) he says distinctly that uniformities are real." (P. 531.)

I am unable to detect any inconsistency in these expressions. The gist of these three statements is this: the formulas usually called natural laws describe certain uniformities of reality.

The expression "description of nature" is by no means nomi-

nalistic. If law is said to be a description, it is not a mere name, but presupposes the existence of some objective reality for the description of which it has been formulated.

4. CAUSATION.

Mr. Peirce's usage of the word "cause" is very unsettled. He says (p. 538):

"The original idea of an efficient cause is that of an agent, more or less like man."

The original idea of "cause" is the struggle of reaching an end or bringing about a certain state of things. The Latin *causa* means "a lawsuit."

In a similar way, the German *Ursache* does not mean the original thing, but a "seeking." *Sache* is the English *sake* and Gothic *sakjô*, meaning "struggle," or "quarrel." It is derived from the same root as the verb "to seek."

Like *causa*, the word *Ursache* was used as a legal term.

Mr. Peirce further states:

"The modern mechanical conception, on the other hand, is that the relative positions of particles determine their accelerations at the instants when they occupy those positions." (P. 538.)

"In dynamics, it is the fixed force, gravitation, or whatever else, together with those relative positions of the bodies that determine the intensity and direction of the forces, that is regarded as the cause." (P. 540.)

"The practice which I endeavor to follow in regard to the word *cause* is, to use it in the Aristotelian sense of an *efficient cause* in all its crudeness." (P. 541.)

"When my idea is a more general and logical one, I prefer to speak of the explanation." (P. 541.)

No wonder that some causes are prior to their effects, others simultaneous, and that effects may even be prior to their causes! Using the word in various senses, Mr. Peirce becomes so entangled about causation, that in mustering the ideas force, position, reason, law, cause, and explanation, he no longer knows which is which.

* * *

Mr. Peirce being unable to bring any consistency into the usage of the term "cause," drops it entirely as a philosophical word. This is Dr. Ironbeard's method, who kills his patient to save him pain.

There was a time when I felt inclined to follow that plan of dealing with words in this predicament. But I found out very soon that there is not one difficult word in philosophical language which is not or was not at some time or other almost universally maltreated by the professional thinkers of mankind. What, then, is to be done? Shall we eradicate all old terms that are erroneously used and create a philosophical Volapük, which will have the advantage of being unincumbered with the errors of a long historical inheritance, but the disadvantage of being nowhere spoken and nowhere understood, except by its inventors?

Dr. Ironbeard's method of dealing with terms is radical. It imitates the method of the social reformers who, on finding something wrong in society generally, propose to tear down the entire social structure, and begin the world over again from its beginning.

Most of the terms which have been in use for centuries and even millenniums, I have found to correspond to a special want of expressing some definite reality or constant group of realities or important relation among realities. The misuse of different words almost invariably has its origin in a consideration of the name alone, to the neglect of the reality denoted by the name. And misuses can be mended only by carefully investigating the realities themselves for the denotation of which the words have been invented. If we were to make a clean sweep of the "superstitions," soul, God, cause, natural law, etc., because in many minds there are superstitious notions connected with these ideas, we should soon have to invent new terms for the realities which necessitated the formation of the old ones. The great bulk of religious and philosophical words originated because in each case there was an actual want of a phrase to denote some specific reality. The errors of the various terms arise because our ideas concerning the nature of these realities have not as yet been matured, and it is the office of the philosopher to contribute his mite toward their clarification.

Causation, in my conception, is transformation. Take any system of conditions and let it somehow be changed. The event which starts the change is called the cause, the new configuration

produced, the effect. The various factors of the system are the conditions or circumstances.

Taking this view, I *do not say* that the effect is the cause transformed. The total effect is the cause plus all the circumstances transformed. The effect is something radically different from the cause. The cause is always an event, that is a motion of some kind; the effect, a new arrangement, a new formation, a new state of things, or perhaps the dissolution of an old state of things.

While cause and effect are different, the whole process of causation, including cause, circumstances, and effect, is to be viewed as one fact, or, rather, as one system of facts; and a process of causation is explained, (as we have seen above) as soon as it is so described that we recognise it as a transformation.*

There is a popular usage which calls the cause of the falling stone gravitation. This kind of cause is not an event, not a motion, but a law of nature, and I prefer to call it "the reason" for the stone's fall.

Mr. Peirce defines a reason as follows:

"A reason, in one sense, is the replacement of a multiple-subject of an observational proposition by a general subject, which by the very conditions of the special experience is predicable of the multiple subject." (P. 558.)

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*It is a matter of course that frequently several events coöperate to bring about an effect. In that case we have our choice, either to speak of several causes, or to treat the coöperation of all of them as *the* cause, or to select one of them to be called the cause, while the others may be counted among the conditions.

The limitation of a system of causation depends entirely upon the purpose of our inquiry, and we must here, as in many other things, use discretion.

Mr. Peirce concludes, that according to my view of causation we can, in a relatively uniform motion, such as the flight of a cannon ball, regard the motion of every moment as the cause for the motion of the next moment. I say "relatively," for absolutely uniform motion does not exist. I grant this, but I do not grant what Mr. Peirce regards as a contradiction of mine, that in that case the cause would be equal to the effect. A man who knows the artifices of the hair-splitting Eleates and the other conundrums of logic, should know that every second of time is different from every other second; 12 o'clock is different from 1 second past 12. He who denies this, has only to miss a train in order to be converted. And how much more different than the moments of time are the various moments of real motion, for in every moment the moving body is in another place, with changed relations; and if that does not constitute a difference, we should have to deny the existence of motion.

This somewhat stilted definition seems upon the whole to agree with what I also call "a reason." All the reasons by which we comprehend nature are formulated in statements which describe those general features of reality which we call "laws of nature."

Who does not see that causes (i. e., events which produce effects) and reasons (i. e., the formulas by which we comprehend the uniformities of nature) are two radically different ideas, and who can deny that the denotation of these two radically different ideas, by one and the same term, must and actually does bring about lamentable confusion in the minds of philosophers! Accordingly, let us call them by different names; never mind what we call them, but let us distinguish them. I regard the usage stated here as the most appropriate. We call "the cause" of the stone's fall that event which removed its support; but when we inquire after the reason why the stone falls, we want to know the law of nature which describes in a general formula that quality of stones which makes them fall.

5. THE FUTURE IN MENTAL CAUSATION.

It seems as if some evil genius had caused Mr. Peirce to cross my position everywhere, even where I should expect to find him in perfect agreement.

Concerning mental and mechanical causation he first startles me with an italicised proposition which declares:

"*There is no mechanical truth in saying that the past determines the future rather than the future the past.*" (P. 539.)

Mr. Peirce apparently intends to discredit the belief that the past determines the future. He adds:

"We continue, for convenience, to talk of mechanical phenomena as if they were regulated, in the same manner in which our intentions regulate our actions, (which is essentially a determination of the future by the past,) although we are quite aware that it is not really so." (P. 539.)

In other words, Mr. Peirce contends that our view of mechanical causation is based upon an analogy with mental causation; the latter being a determination of the future by the past, we conclude that the former is regulated in the same manner.

This is an old error which rests on the supposition that cognition begins with introspection or self-knowledge. The truth is that all cognition begins with objective observation.

We have to say, (1) that man's view of mechanical causation has not been fashioned after the model of mental causation, and (2) that the future actually enters as a factor in mental causation. We do not believe that the future determines the past, but it does determine the present.

Should we judge of the causation of mechanical motions from our own mental experience, we should certainly reach other conclusions than we do, for the most characteristic feature of mental causation, that which essentially distinguishes it from mechanical causation, is the fact that the future actually enters into it as the main factor.

We as rational beings, and the lower animals also on a smaller scale, do know to some extent the future. We know by experience the effects of certain actions. This fact of the future's being partly known, makes it possible for the future to enter as a factor in mental causation. I go so far as to maintain that there is no mental causation except some consideration of the future be contained in the motive cause. The presence of a plan, of an end kept in view, of an aim to be reached in the future, is exactly what distinguishes the purposive action of thinking beings from mechanical events.

6. MENTAL CAUSATION.

Mr. Peirce has discovered in my expositions of mechanical and mental action what he believes to be a flagrant contradiction, and, as if it were the exhibition of my scalp, displays it triumphantly (§ 27) in capitals and italics. "No objection can be made," I said, "to the possibility of explaining the motions . . . . of the brain by the laws of molar and molecular mechanics." And "yet the simplest psychical reflexes cannot be explained from mechanical or physical laws alone."

Is this really a contradiction, or is it Mr. Peirce's inability to discover the agreement between the two statements? Let us see.

Take a little toy fish of tin with a small iron rod in its snout,

floating in the water, and push the fish so that it shoots forward with a certain velocity in a straight line. Now take a magnet and hold it at a short distance from the prolonged path of the fish. The fish at once changes its course; it now describes a curve which according to the laws of mechanics is determined (omitting any other possible modifying circumstances) by the momentum of the push, the velocity of which is gradually diminished by the friction of the water, and the attraction of the magnet. These are the data, and from these data the motion of the fish is unequivocally determined by the laws of mechanics.

Now, when we speak of the motion of the fish, we mean the motion, and not the iron rod, or the qualities of the iron rod, in its snout. While speaking of motion or the laws of motion, and while calculating the curve of a motion, our ideas move in a perfectly defined sphere of abstraction from which all other things and considerations are excluded. This method of abstraction which is the essence of human thought and also of that special kind of human thought called science, is the way by which alone we are enabled to arrive at clear distinctions and lucid explanations. We have to keep our various abstractions stored in an orderly manner in our mind, each one in a special box. If we do not distinguish the different spheres of abstraction and their limits, we shall soon confound all issues in a hopeless chaos.

But we find, on further examination, that in this limitation of the description to the abstract sphere of pure motion only a part of the process before us is described. The description explains fully, exhaustively, and satisfactorily the mechanical aspect of the case, but it does not explain why the magnet attracts iron. The attraction of the magnet consists in the definite qualities of (1) the magnet, (2) the iron, and (3) the medium between them. When we inquire after an explanation of the physical qualities of things, we enter into another sphere of abstraction, viz., that of physics. That physics will have to be explained as a domain of molecular mechanics may be mentioned incidentally.

Take another and simpler instance: the fall of a stone. The motion of the stone, its increasing velocity during the fall can be

explained according to the laws of mechanics; but that quality of the stone called gravity, which is the reason of its fall, cannot be deduced from the laws of mechanics. The gravity of a mass is treated in mechanics as the given fact or datum, an investigation into the nature of which is excluded from the sphere of mechanics. He who demands of mechanics an explanation of gravity searches in the wrong box.

When we come to the investigation of psychical phenomena, we strike a feature which is entirely absent in mechanics, physics, and chemistry. It is the appearace of feeling. Feelings vary according to the various impressions made by surrounding objects. The same objects making the same impressions, special kinds of feelings come to stand for or to represent their respective kinds of objects, and thus feelings acquire meaning, feelings become ideas. This peculiarity of sentiency, that it has acquired meaning, is the characteristic feature of "mind."

When speaking of mind I refer to all those phenomena of meaning-freighted feelings which ensoul thinking beings; and the domain of psychology is thus again quite a distinct domain of abstraction.

Now let us return to the contradiction of which Mr. Peirce accuses me.

An idea which physiologically considered is a special brain-structure or combination of brain-structures, reacts upon a given stimulus, which, let us say, is the sound of a certain word. The word is a sound-symbol and the word possesses a certain meaning. The word spoken having the same meaning as a special idea that is thought, while its brain-structure is agitated, possesses a quality comparable to chemical affinities. This peculiar word will serve as a stimulus for this peculiar idea. It will not (at least not directly) stimulate other ideas—as little as a chemical that has no affinity for the ingredients of another chemical will cause a reaction. Why the motion takes place calls for a psychical explanation, but the motion itself takes place in strict accord with the laws of mechanics.

But are not the laws of mechanics annulled by the laws of physics, and those of physiology by the laws of psychology?

No, they are not annulled, but modified.

A piece of iron that falls to the ground with the same velocity as a stone of equal weight will be held up by a magnet strong enough to hold it. This is not an annulment of the gravity of the iron; it is not a reversion of the law of gravitation; gravitation holds in this case as good as in any other. It is only a modification and a complication. We must remember that the law of gravity does not say, the non-supported piece of iron or stone will drop; it says that all bodies are attracted by the earth with a definite force depending upon their mass and position. And this attraction takes place in our example; the iron supported by the magnet retains all its inherent gravity, which is constantly asserting itself, although counteracted by the force of the attraction of the magnet.

Since the mechanical, chemical, psychical, etc. qualities represent reality in various abstract aspects, we should know that there are no purely mechanical, no purely chemical, no purely psychical phenomena. Every real phenomenon, i. e. the original whole from which the abstractions have been made, presents a complex state of things of which many various aspects can and must be taken.

I repeat now without fear of contradiction or miscomprehension, that brain-motions are perfectly explainable by the laws of molar and molecular mechanics, while psychical reflexes, not being purely mechanical processes, cannot be explained by mechanical laws. The properly psychical and the properly mental are other elements of an entirely different nature from the mechanical and the physical. They belong to a radically different sphere of abstraction. He who tries to explain the psychical by the mechanical, looks for his explanation in the wrong box. And he who regards the proposition that the mechanical laws hold good for all motions without any exception, but that they cannot be called upon to explain that which is not motion, as a contradiction, has not as yet learned practically to apply the method of abstraction.

It is strange that we have to give this little lesson in the elements of abstraction lore to so prominent a logician as Mr. Peirce. We feel inclined to exclaim: "Art thou a master of Israel and knowest not these things?"

STRAY SHOTS.

There are a number of incidental comments aimed at scattered points of my position. I call them "stray shots"; they have exploded without harm. While going over the battle-field I shall pick them up and will throw some of them back into Mr. Peirce's camp, whence they came.

Mr. Peirce is in the habit of calling every approach to his views "deep," while divergencies are branded as "shallow."—

Hume's scepticism is called Leibnitz's principle, by which latter Mr. Peirce apparently means that innumerable single cases of experience alone do not constitute certainty. Why Mr. Peirce demands that Hume's conclusion which Leibnitz never would have countenanced, should be indentified with Leibnitz's principle from which it is derived is not apparent.—

How easily Mr. Peirce changes his opinion! Venn's "Logic of Chance," which Mr. Peirce so much admired formerly, has become "a blundering little book."—

Synechism and agapasticism, viz., the principle of continuity and the idea of love as main factors of evolution are nothing new. I have always defended them, although not in the peculiar way that Mr. Peirce does.* In his article "Evolutionary Love" he appears to me unjust toward Darwin. I do not think that I should improve my propositions, which are in their way synechistic as well as agapastic, by adopting either Mr. Peirce's terms or his presentation of these principles.—

Mr. Peirce says, he does not doubt that my idea of mental causation was intended to be an improvement on his molecular theory of protoplasm. I can assure Mr. Peirce that I had no such intentions. I held my view long before I ever had a chance of knowing Mr. Peirce's molecular theory of protoplasm. Moreover, I am unable to discover any similarity between his views and mine.—

* See my article on "The Continuity of Evolution" in *The Monist*, Vol. II, No 1; and also "Monism and Meliorism," p. 73, where "the struggle for the ideal" is contrasted with "the struggle for life."

I took pains to explain that, if we disregard the notion of form, every transformation, that is, every case of causation, will appear as a most miraculous and inexplicable event. To illustrate my view I said that "*supposing we had no idea of the laws of form or only an incoherent and fragmentary knowledge of them*," it would be "a very wonderful thing" that two congruent regular tetrahedrons when put together will form a hexahedron—a body which is something new." And I added to this statement, "*but the laws of form do perfectly and satisfactorily explain it.*" How great was my astonishment to see Mr. Peirce with great complacency take up the problem and explain it! Indeed, it is true. That the combination of two congruent regular tetrahedrons will make a hexahedron, is wonderful *only* to him who does not understand the laws of form. Otherwise, it is not wonderful. I was amused at Mr. Peirce's ingenuity to prove to me that it is a case of $8 - 2 = 6$.—

There is a difference between the combination of two tetrahedrons and of the atoms H_2O. Mr. Peirce tells me, that the one is ideal, the other real—"a difference which to his Scotistic mind is very important." Did Mr. Peirce think, indeed, that I was not aware of this difference, or does he mean to establish a rule never to compare the relations as developed in the sciences of pure forms to the relations that obtain in reality?—

Says Mr. Peirce in one passage, there is a difference between the ideal and the real, which to his Scotistic mind is very important. In another passage he declares that "the nominalist alone makes a sharp distinction between the abstract and the concrete."—

Mr. Peirce smiles at the endeavor of reconciling religion with science. For he thinks:

"It is a thing which will come to pass of itself when time is ripe, and that our efforts to hasten it have just that slight effect that our efforts to hasten the ripening of apples on a tree may have." (P. 545.)

Mr. Peirce forgets that the religious fruits of the conciliation between religion and science are our own sentiments. He who says that man should be indifferent about working out the truth, on the plea that truth will take care of itself, is comparable to the apple-tree, that refuses to work out the ripening of the apples. The proposi-

tion to let religion and science work out their destinies, one of which is their mutual agreement, of themselves, is irreligious and also unscientific. Truth will not take care of itself if we do not strain all our efforts to find truth; and the kingdom of heaven will never come unless (as Christ taught, Matt. 11, 12) "it suffereth violence, and the violent take it by force."—

The same Mr. Peirce who says that our efforts to hasten the conciliation of religion with science are useless, believes in miracles and proposes a theory that prayer can work miracles.—

Several philosophers, such as Locke and Hegel, have complained of the uselessness of the logical law of identity $A = A$, and also of its barrenness for any practical purpose. The law of identity has been invented nevertheless, because there is a want for it; and this want, in my opinion, was felt because the statement of sameness (as set forth in *The Monist*, Vol. III, p. 70, et seqq.) is one of the most elementary and important forms of reasoning, being indispensable, for instance, in mathematics where it appears as equations. We may simply laugh at the old logicians

> "Who whirl in narrow circling trails,
> Like kittens playing with their tails."

We may impatiently discard the whole proceeding as empty talk, yet I submit that we had better try to understand the meaning of their unprofitable exertions and the drift of their apparently meaningless argumentations. If we regard the principle of absolute identity as the formula of sameness (in the sense explained in the quoted passage, *The Monist*, Vol. III, No. 1, p. 70, et seqq.) emptied of its contents we shall understand why logicians wasted so much energy on an entirely barren subject. We shall readily condone their mistakes in consideration of the importance of the subject. It is difficult to say how much we have profited by their blunders.—

Mr. Peirce uses the terms analytical and synthetical in a new sense for reasons which he explains at greater length in his "Theory of Probable Inferences." He says, "analytical reasoning depends upon associations of similarity; synthetical reasoning upon associations of contiguity." I willingly grant to the scientist and the philosopher the liberty to change the historical meaning of terms if the

traditional usage is not helpful in our dealings with the facts which they were invented to describe. However, we must not change a term without good and sufficient reasons. In the present case, I still prefer the traditional usage of the terms "analytical" and "synthetic."—

Mr. Peirce takes the liberty of changing terms for himself, but he resents it in others.—

Mr. Peirce disapproves of the usage of the word "construction" in the sense of systems of formal thought, such as the decimal system, etc., etc. "Because," he says, "the word is imperatively required in the theory of cognition to denote a mathematical diagram framed according to a general precept." On the strength of this argument we might as well disapprove of calling churches, mosques, houses, cottages, or any kind of edifice, "buildings," because the word "building" is imperatively required to denote business-buildings.—

Mr. Peirce says that according to my statement (in ¶ 163) "every element of compulsion is to be excluded from the conception of necessity." Having never made such a statement, I looked up the passage, which is the last but one paragraph in *The Monist*, Vol. III, No. 1, page 86, and find that Mr. Peirce must have misread the sentence, "compulsion excludes free will, and necessity does not," which, of course, has an entirely different meaning.—

Mr. Peirce identifies evolution with real growth, regarding it as opposed to the law of the conservation of energy. He regards everything as a product of such growth, or *Erzeugung*, and adds, "I fancy it is this cautious reflectiveness of my procedure which especially displeases Dr. Carus." Mr. Peirce does not use the word "bold." He says, "cautious reflectiveness."—

I did not say that causation is to be explained from the law of the conservation of matter and energy. I said (*The Monist*, Vol. II, No. 4, p. 566) that the law of the conservation of matter and energy throws light upon the problem of causation. The law of the conservation of matter and energy and the law of causation describe the same thing under two different aspects. If we understand the one, it will help us to understand the other.—

Kant's chapter on the Architectonic of Pure Reason is well

known to me, but I think that Kant was possessed of a peculiar love of architectonic which has contributed not a little to rendering the system of his philosophy unnecessarily labyrinthine.—

It is surprising to find a man whom I always regarded as a Kant scholar of first degree saying that "Kant makes space a necessary form of thought." Now, as a matter of fact, Kant does not make space a form of *thought*, but of *Anschauung* or intuition. We cannot understand Kant unless we understand this distinction.*—

Kant conceives of causation as a necessary sequence. Mill, who objects to the idea of necessity, replaces Kant's words "universal" and "necessary" by "invariable" and "unconditioned," a substitution which was made with the outspoken intention of radically changing the meaning of the phrase. Mill's terms are *not* "more exact," as Mr. Peirce says, but different. They are worse than less exact to a Kantian, and can appear more exact only to those who take Mill's view, which is nominalistic. And this substitution of Mill's is regarded by realistic Mr. Peirce as a mere "rewording of Kant's definition"!—

Mr. Peirce makes too much of the idea of "*Erzeugung*, which," as he correctly says, "is Kant's word for the sequence of effect from cause." Yet Kant's idea of *Erzeugung* does not conflict with "the modern mechanical doctrine." Kant says in that very same chapter, "*Aller Wechsel* (*Succession*) *der Erscheinungen ist nur Veränderung*," i. e., "All change (succession) of phenomena is only transformation." (!) Does not Mr. Peirce know that Kant calls every world-conception that stands in contradiction to the mechanical principle "a philosophy of indolence," or "*faule Weltweisheit*"?—

The same Kant who proposed a mechanical explanation of the evolution of the starry heavens, objected very strongly to that kind of explanations "which derive all order from chance"; and speaking of Epicurus's "absolute chance" (!) he adds: "Epicurus was

* For details see, in *The Monist*, Vol. II, No. 4, page 518, et seqq., and 527, et seqq., my articles, "Mr. Spencer on the Ethics of Kant," heading iv, and "What Does Anschauung Mean?"

I now forgive Mr. Spencer; for if a Kant scholar like Mr. Peirce can fall into this unpardonable mistake, why should not Mr. Spencer, whose knowledge of Kant's writings is, as he confesses himself, extremely limited, have the same privilege?

even so reckless (*so unverschämt*) as to demand that the atoms should deviate from their straight course without any cause." Mr. Peirce has either overlooked in Kant these passages, or, if he has read them, he has never taken them to heart.—

Mr. Peirce objects to my statement that according to his philosophy the domain of mind is characterised by absence of law. He argues: "Is not one of my papers entitled 'The Law of Mind?'" Yet this law of mind, he states two lines further on, "requires its own violation." (P. 552.)—

The "sporting" of the primeval chance, Mr. Peirce says on page 552 of this number, is "not undetermined and indeterminable," because "its ultimate result must be an entire elimination of chance from the universe." Shall we understand that the "arbitrary sporting" of the primeval chaos, with which Mr. Peirce (according to *The Monist*, Vol. I, No. 2, p. 175) begins his cosmogony, was determined? If absolute chance is determined, why not call such a philosophy "determined Indeterminism"? We try hard to understand Mr. Peirce, but sometimes we really have to give it up.—

Physiology teaches that memory alone changes feeling into consciousness, but the consciousness of Mr. Peirce's original Chance is without memory and habit.—

Chance, a being living and conscious, has, according to Mr. Peirce, created the world, but the ultimate result of evolution must be an entire elimination of Chance from the universe. Thus it appears that the creation of the world is an act of divine suicide. The world-process is a slow degeneration of God, finally ending in his complete annihilation.

RETROSPECT.

In summing up the result of the whole battle, we find that there is not a single question on which we have to yield or even modify our position. Our position remains the same, while Mr. Peirce's position has become glaringly untenable. There is one point, however, in which justice demands that we should recognise that he is right. I should not have called Hamilton "Mr.," but "Sir William." I can, however, assure Mr. Peirce that this mistake

of mine (which in all my allusions to Hamilton occurs only once) was a mere slip of the pen; it was not ignorance on my part and still less was it any disregard of the rules of politeness.

We are obliged to reject the favorite ideas of Mr. Peirce, and have only to add that our esteem for him has not been lessened, in spite of all disagreements, and notwithstanding the flaws we have detected in his reasoning. On the contrary, our admiration for him as a dialectitian has been greatly increased, for, in truth, we have never before seen propositions so untenable in their nature, so odd and almost bizarre, as those of "absolute chance," of "matter as effete mind," of "feeling as being the inner aspect of chance," and of "real growth as opposed to the conservation of energy," defended with greater adroitness.

Mr. Peirce is unusually familiar with certain branches of learning, of which he has made a specialty, and also with general philosophy; but he has original ideas, and he prizes them too highly. Where he makes no use of his originality, he does extraordinarily good work. Thus, most of his papers on logic, published in sundry magazines, are, in their critical as well as constructive parts, strictly scientific and almost free from apocryphal speculations. Only slight hints in them have been a puzzle to me and other readers of his essays. Of late, however, Mr. Peirce has come out more explicitly with his peculiar philosophy, and we regret to say that the more he allows his original ideas to enter into his thoughts, the more warped are his theories.

While we regard Mr. Peirce's original ideas as erroneous, we must say that they are nevertheless highly interesting and stimulating. His propositions are presented so vigorously, so attractively, so brilliantly, that while perusing his articles, we find them remarkably suggestive; we enjoy them as we do poetry. They read like a romance of the origin of the world or a fairy-tale of metaphysics.

Mr. Peirce's views should receive the consideration of all earnest students of philosophy; for he goes to the root of its main problems, and his very errors are instructive.

EDITOR.

THE FOUNDATIONS OF THEISM.

I. THE REALISM OF THEISM.

IT IS commonly alleged that there is deeply seated in the human mind a belief in the existence of a supreme being, and that the prevalence of such belief is evidence that it has a basis in supernatural revelation. It is urged in reply to this assertion, that this belief is not universal, and that in any case its presence cannot be regarded as satisfactory evidence that is well founded. It is known that the disposition to worship is aroused by grand and beautiful objects; and as Darwin well remarks in one of his letters, the natural sentiments of the sublime and the beautiful easily assume a personal direction. Scientific explanations, moreover, push a personal source of things ever further from us, and it is becoming apparently more easy to doubt or deny any such source whatever.

Prevalent human instincts and intuitions are, however, the result of experience imperfectly or perfectly digested, as the case may be. In most instances they yield to analysis something of value. A more plausible explanation of the theistic instinct is the anthropomorphic one. Man knows that he originates many movements, both of his own body and of other material things, and he knows of no other real source of such movements. He therefore, in his primitive state, before scientific explanations are attained, naturally refers motions in nature to an original personal source. This, it may be supposed, is the natural habit of the unsophisticated mind, and is at the bottom of theistic belief, whether as unexplained in consciousness, and therefore an instinct, or as a distinctly formulated belief. The phenomena of nature must have originated somehow, and there is no other conceivable source of motion than a personal one.

Facts developed by scientific research tend to weaken this anthropomorphism. The indestructibility of matter means that it has never been created. The conservation of energy states that matter has always been in motion. The law of organic evolution is supposed to do away with the necessity for creative intervention in the origination of plants and animals. Finally, the observed facts of the evolution of mind show that this, the light of the world, grew like the organic beings which it inhabits. Nothing higher than man has been found, and there seems to be no ground for suspecting the existence of any higher mind. And man himself dies and undergoes dissolution, like other organic bodies. The result of this use of the facts of science is agnosticism, at least. We know of nothing beyond what they teach, and some agnostics go so far as to say, "ignorabimus," we shall never know. Agnostics, however, have their faces set in different directions. Some rest in it as a relief from mental toil, as persons more theologically inclined join a church. Others, believers in the progressive evolution of knowledge as of other phenomena, set themselves to explore the unknown country, believing that our opportunities in this direction are practically unlimited.

Let us look again at this anthropomorphism which is so deeply seated and so widely spread. Its essence is the fact that we control our own bodies in a great degree and that our material organs obey the behests of our mind. We do things for, to us, satisfactory reasons, and for satisfactory reasons we leave many things undone, which we could readily do. What has science done towards explaining this most ordinary phenomenon? We may truthfully say, absolutely nothing. It remains a fact that a majority, if not all animals, move their bodies in their entirety or in part, because they have sensations. In the lower animals these sensations are merely either sense-impressions from without, or they are from within, being produced by their physical condition. We rise but little in the scale, when effects of memory are evident, for we find that many actions are due to experience of the result of former actions. With still higher development, mental organisation becomes more apparent, and the reasoning and emotional states have more and more

distinct outcome in intelligent acts. But the mechanism by which the act is called forth by the mental state, has never been explained.

The difficulty lies here. A sensation, or a state of mind, weighs nothing. A material body, let it be a cell or a mass of cells, as a muscle, weighs something. How then can the former move the latter? From a mechanical point of view, it cannot be done. For that which has no weight to set in motion anything which has weight, is to violate the law of the conservation and correlation of energy. And this law is not only an *a priori* necessity, but it has been demonstrated *a posteriori* in so many cases that exceptions cannot be thought of. So a school of physiologists say that *it is not done.* No animal eats because it is hungry, or drinks because it is thirsty. The man does not direct the muscle of his arm when he writes, nor those of his tongue when he speaks. But it is easy to see why such a school of physiologists includes but an infinitesimal part of mankind.

There is a school of evolutionists who account for the whole matter in harmony with the views of the physiologists above mentioned. I refer to the Post-Darwinians, who account for evolution by natural selection exclusively. That is, animals originally moved aimlessly in all directions. Those whose movements were beneficial to them, survived, while those whose movements were not beneficial, or which were injurious, perished. As frequent motions in a given direction lead to habits, so were inaugurated movements which were habitually beneficial to the actors, which have therefore persisted and multiplied. Thus were established the multifarious habits of animals and men. Consciousness had nothing to do with the process. It merely acted the part of the onlooker, being simply aware of what went on. "Like the locomotive whistle," says Huxley, "it made considerable noise, but did none of the work."

To a person familiar with the facts of the evolution of the structures of animals, this seems like a most inadequate theory. It is a commonplace that no kind of selection, either artificial or natural, ever originated anything. Selection simply selects between existing alternatives. The fundamental question of evolution is, What is the origin of things? What is the fate of things originated? is a sec-

ondary question. To this first question the Post-Darwinian reply must be, that everything possible has originated no one knows yet how, so that what has survived was necessarily to be found in this *embarras de richesse*. This is an enormous assumption, and one to which the history of the life of past and present ages lends no support. No such multifarious and promiscuous variation is known to have occurred in living or in extinct organic beings. But if the variations have not been infinite, then the chance of the existing one having been hit upon becomes greatly reduced, and the chance of its having occurred at the same time in individuals of opposite sex is still smaller. Finally, the chance of its not being immediately bred out by the overwhelming numbers of individuals not possessing it, is indeed infinitesimal. In fact, it is evident that variations of structure must have appeared in numbers of individuals of a species at the same time, in order to secure survival. This indicates a common cause of general application. That such causes have existed and been effective at all periods of past and present time is amply proved by the facts of geology and paleontology. The most influential in effecting change of form and structure has been the motion of the body and of its parts necessary to secure its food, to defend or protect itself from dangers, and to reproduce its kind. The direct mechanical effects of these motions on all the materials of the body may be traced in the successive stages of the forms of past ages to those of the present time.

The objections above made to the theory of multifarious variation of organic forms, apply with equal force to the theory of multifarious movements of organic beings as furnishing the source of intelligent habits. An additional and especial objection to the latter hypothesis is the fact that it does not recognise the well-known adaptability of animals to new situations and circumstances. If the events of life were a routine moving with mathematical precision, the theory of origin from multifarious variations would have a better foundation; but this is not the case. Food, friends, and enemies do not appear in stated periods, quantities, or qualities. Emergencies are common, and variation of circumstance is the rule. Without sensation, uniform habits would but lead to destruction.

Everything which should not be presented in the habitual form and at the habitual time would be neglected. Food and drink would be refused, or not obtained; defense and reproduction would not be attempted under the proper conditions. In fact, the conduct of living beings would be no more intelligent than that of inorganic matter in motion, were sensation to have no share in the process. But as soon as we believe that the habits of animals are due to hunger, thirst, and the perception of temperature, resistance, etc., their acts become intelligible, and the formation of habits becomes a necessary consequence of memory or the faculty of subsequent recognition of sensations experienced at a previous time.

It is, in this connection, of great interest to recall the diverse effects on our mental history of sense-impressions, as compared with the effect of thought. Sense-impressions are not remembered in the proper sense of the term. The repetition in memory is always vastly more indistinct than the original state of consciousness; so much so as to be a very different thing. Thought, on the contrary, when remembered at all, is an exact repetition in quality of its first presence. The presentative consciousness has one quality; the representative and re-representative have another quality. This shows us that the structural arrangement of brain substance concerned in the latter forms of consciousness have a far more permanent quality than that due to the former. They thus constitute more permanent acquisitions, and this being the case, must have a most important bearing on evolution.* This is because it is a representative state which determines action. The process of determination may become so rapid as to be almost instantaneous; but it had to be learned, and the representation was what gave the act its character and which organised the machinery of the automatic or reflex act.

I here refer to the low degrees of consciousness sometimes called subconsciousness, and the expression, "the subliminal consciousness," introduced by F. Meyer. All shades of consciousness intervene between the most distinct forms and the unconsciousness

* *Proceedings of the American Philosophical Society*, 1889, p. 495.

of the reflex state. Intelligent subconsciousness is a low stage in this evanescent series. Stages on the passage to and from sleep, and other forms of unconsciousness due to physical causes, are properly termed subconscious. There are reflexes which are due to mechanisms which we inherit from our animal and human ancestors, which are sometimes accompanied by consciousness. The amount of intelligence displayed will depend on the function involved. Experiments on vertebrate animals show that intelligent adaptation of the movements of the body have been transferred forwards in the brain during the course of evolution. Thus, a fish which retains the medulla only, will guide itself through the water so as to avoid danger. If the cerebellum and thalami are left to a reptile, it will avoid destructive acts. But if a mammal is deprived of its hemispheres, its actions are without design, and it is incapable of self-preservation.

It may be that in the temporary absence of the higher consciousness, the lower forms which once existed in our ancestors may be revived, as in some of the elements of our dreams, and in some forms of cerebral disease, when much of the blood is withdrawn from the cortex or parts of it. The amount of consciousness necessary to the performance of intelligent acts depends on the novelty of the situation. Many of the theories on this subject, however, take it for granted that intelligent acts arise in primarily unconscious states. This is only credible on the supposition that such acts have arisen by natural selection only, a view which I have combated on a previous page. Some authors use expressions which can only imply unconscious consciousness. This is of course absurd and self-contradictory. No source but sensation can be found for intelligent acts.

It is true that there are some movements of organic bodies which have an intelligent appearance, to which we cannot ascribe consciousness. Such are those of the spermatozoöids and of the leucocytes. Some of the lowest animals and plants cannot be yet proved to be conscious. We cannot now explain the nature of the movements which these forms exhibit, but they will probably yield to research. Enough it is for our present purpose to know that the

majority of animals are conscious for a large part of their lives. And we have abundant evidence to show that movements inaugurated in conscious states may be performed, so soon as learned, in unconsciousness, and become part of the mental furniture of the animal.

It seems, then, that the control of ponderable matter by mental states is not the exclusive prerogative of man, but is a phenomenon of common observation in the animal kingdom. The facts indicate that it is characteristic of mind to move resistant and tridimensional matter under suitable conditions. These conditions are rigid, but within the limits which they define, the sequence is definite. It is difficult to believe in anything which is in direct violation of mechanical necessity, and a mere hypothesis to that effect would not deserve a moment's consideration. But the belief that the body, or parts of it, are moved in direct obedience to mental states is founded on more numerous observations than are most of those beliefs which we hold to be true. In fact there is no scientific doctrine better supported by observation and experience than this one. On this ground alone, then, we are compelled to believe in something in the universe which is supermechanical, or extramechanical. We may call this supernaturalism, or occultism, or what we like, but the fact remains. We have in it the germ of theism, anthropomorphic, if you will, but one which grows in importance as we come to examine further into the characteristics of mental action.

Before going into this part of the subject, I will refer to the part played by mind in evolution. From what has gone before, it is evident that this part has been an important one. If structures are produced by motions, it is clear that habits produce structures, and *vice versa*; and that under the law of natural selection only the useful and harmless ones have survived. It follows, then, that progressive evolution of form is secured by the presence of consciousness, and must, sooner or later, fail without it. With development of intelligence the progress must become more continuous and rapid. The facts of paleontology confirm such a hypothesis; since the more intelligent animals (Mammalia) have generally supplanted the less intelligent, (Reptilia and Batrachia), whenever brought into conflict

with them. The supremacy of the intelligent over the unintelligent Mammalia is also clearly shown by research into their past history. The modification of type, or evolution, has also become more and more rapid as time has advanced and intelligence developed.

There is another reason why the intervention of supermechanics into the process has been necessary to secure such results as we observe in the evolution of life. The law of inorganic evolution is, as Spencer epitomises it, "the integration of matter and the dissipation of energy." Natural chemical reactions when not interfered with by human intelligence, produce solids and give out heat. In other words, they result in death and not in life. To produce life something different from chemical energy has been necessary. And as the case is a parallel one to the evolution of the types of life, we may suspect that the agency at work has been a related one. It is some form of energy of the vital class which is able to overcome the bonds which hold dead matter in their adamantine grasp; and it is evident that such an energy could have been organised only in some region where mechanics of a superchemical order prevail. If we take a large view of the universe the alternatives of life and death present themselves clearly before us. The law of the latter is the integration of matter and dissipation of energy. The law of the former is the converse; the loosing of the bonds of matter, and the production of mechanism for the raising of the type of energy. The first is catagenesis, the latter is anagenesis. The end of catagenesis is the extinction of all mind and all life. Anagenesis sustains both. The best foundation for our belief in anagenesis is that it exists. Catagenesis has not destroyed it, and this fact must lead us to suspect that it is the product of an agency which is superchemical; and the only such that we know is consciousness.

In the presence of such a far-reaching hypothesis we are called upon to consider more particularly the relations of mind to its physical basis. The essential condition of the existence of mind as we know it, is metabolism. The substance * of the nervous cells must be

* Recent experiments conducted in the laboratory of the Johns Hopkins University show that the cytoplasm of cells, which are exhausted by labor, is vacuolated.

in a state of decomposition and recomposition; old material loosing its chemical bonds and giving forth energy, and new material arriving to undergo the same process. The energy thus produced displays the phenomena of mind, and as such differs widely from the inorganic energies of heat, light, etc. The extent to which it displays habits depends on the part of the nervous structure where it is produced. In the spinal cord it is strictly automatic, and as we approach the hemispheres the so-called voluntary element becomes more apparent, until a region is reached where conception, deliberation, and judgment have their seat. In this region energy is purely mental in its attributes, and it unlocks the executive mechanism of the body, and puts it in action in accordance with the needs of consciousness. So far, mechanical laws explain the order of events. The supermechanical resides in the mental content and its effects on the outgoing energy. No quantitative relation can be shown to exist between the results of the mental processes of classification, conception, judgment, etc., and the amount of incoming or outgoing energy. Indeed it is plain that none can exist, if the statement already made be true, viz., that thoughts are without weight. This part of the subject requires critical treatment, but the general result is included in the above statement, which is sufficient for our present purpose.

Since consciousness possesses such extraordinary relations to matter we may well suspect that it has a wider distribution than comes within the purview of our present limited ken. Why should it not protect and nourish itself under conditions different from those which prevail in our planet? The one condition necessary to it is metabolism—which means free energy. The kind of physical basis cannot be important, provided it be capable of exhibiting this kind of non-automatic energy. Automatism and all its reflex consequences are the death of consciousness, as every one knows. From such a type of energy all the fixed types of energy must have been derived, and with them the types of both mental and physical structures. In its freest form it should have as a physical basis a form of matter which should be without habits, but always ready to undergo a catagenetic change into routine energy and ultimate unconsciousness.

Such a medium should be unspecialised matter, and the consciousness inhabiting it would be a creator. Such consciousness would be readily transmitted wherever the physical basis should be suitable, and one such substance is our protoplasm. The probable inferiority of protoplasm as a physical basis is indicated by the long and tedious education which has been necessary to enable beings made of it to attain a high order of intelligence. In such a basis anagenesis is slow, and catagenesis is easy. Other bases might be imagined where the reverse would be the case. No assumption can be made as to a constant and limited amount of consciousness in the universe. That such is the case is supposable; but it is also supposable that the amount of suitable physical basis may be increased by a process of assimilation of non-conscious matter, as is done by animals in digestion and reproduction. This process might continue until all matter should be brought into that generalised condition which is necessary to the continuance of consciousness. The entire universe would then be conscious, and a maximum limit would be reached. In the primitive consciousness, whatever its extent in space in the Universe, we have the Supreme Being or Person.

II. THE IDEALISM OF THEISM.

What I mean by the above expression is the theism which is supposed to be demonstrated by idealistic metaphysics. There are two forms of this alleged demonstration, both of which have for their starting-point the basis of the idealistic philosophy. This basis is the fact that we know nothing of matter excepting as sense-impressions. From this it is inferred that were conscious beings to become extinct, matter would no longer exist. It is also a consequence of this belief that what we observe of the conduct of matter, which we call by the name of natural law, is of purely mental origin.

If now the universe consist wholly of mind, the totality of it, either as reduced to a body of general laws, or to a single comprehensive generalisation, or concept, is one form of idealistic God. The other demonstration is as follows. Since matter exists as mental states, and since these mental states are common to mankind,

who are mortal; since these mental states reproduce themselves from generation to generation, it is inferred that a permanent mental state exists, which possesses the permanent sensations we call matter. And this common mind of humanity is God.

The difference between these deities is this. In the first case he is an abstraction of the human mind and therefore not a person apart from such men as are capable of the generalisations of which he consists. In the second case he is a person apart from humanity. The validity of either demonstration to the thinker depends on his point of view. To every one but the idealist, the first proposition is atheism. The evidence for the second is metaphysical anthropomorphism, and would be a demonstration, were the theory of idealism well founded.

The fact that we only know matter as sense-impressions does not, in the opinion of realists, prove that it does not exist as the resistant and extended. Resistance of each part to the movements of other parts (energy), and extension in space, are conditions about which we have a great deal of information. Our lives are spent in overcoming the one, and in getting round the other. Our methods of dealing with it represent the antithesis of those employed in thought-processes. The latter are best performed in the absence of the muscular exertion which is so necessary in dealing with the former. I have referred to the well-known difference in consciousness between sense-impressions and the representation and re-representation of them. The difference certainly implies a difference in the immediate sources of the respective kinds of consciousness. The one is produced by something different from that which produces the other. In short, the one is produced by the contact of matter external to our physical basis, and the other is produced by a modification of brain-structure; and in the first place by that simplest form of it which is the cause of memory. The effect of such observation is the conviction that matter exists as something outside of consciousness or mind, in spite of the fact that we only know it in consciousness. In a word, consciousness and knowledge imply the existence rather than the non-existence of something which is known.

The fundamental actualities are, then, subject and object; or, in popular language, mind and matter. Philosophy includes the sciences which embrace the knowledge of both subject and object; but the practical philosophy is the science of the mutual relations of the two. It may be said that subject and object are opposite sides of the same reality, but this form of expression appears to me to be no more accurate than the statement that energy and matter are opposite sides of the same thing. As energy is the motion of matter, mind is the intelligence of matter; and both may be called properties of matter with equal propriety, since both are impossible without a physical basis. Mind, however, differs from energy in possessing some intrinsic qualities which are in essence independent of the qualities of the physical basis; and these intrinsic qualities are the forms of logic. These are, however, but a part of the totality of mind, although they underlie or penetrate all its representative activities.

While mind then cannot exist without a physical basis, it remains to be considered whether any other objective world is necessary to its existence. It is sometimes alleged that consciousness could not exist without an objective, exterior to its physical basis. If, however, consciousness is a necessary attribute of free energy, the latter purely metaphysical speculation has no foundation. The "intuition of Being" (Rosmini) would exist, albeit not much specialised, in the absence of multifarious objects; but the forms of logic would characterise it nevertheless.

It is alleged that we can never know matter as it is, because our observation is restricted to the mutual relations of its component parts. In this assertion our intelligence necessarily concurs, but this need not cause us to relax our exertions in the pursuit of knowledge. The practical philosophy is, as already remarked, the knowledge of the relations subsisting between mind and matter, so that our most valuable acquisition will be in the end the laws of a relation. We may well postpone our endeavors after the absolute, even if we can ever attain a knowledge of it. The realist is content to believe that if we do not know "things as they are in themselves," it is because of the imperfection of our senses. But we are constantly discover-

ing new aids to research, and we can put no limit to our power in this direction.

The research into the relations of subject and object, means to theology, an investigation as to the existence and nature of Deity, and as to an existence for conscious beings in other than terrestrial life. The pure idealist reaches an affirmative answer to these problems by a short and easy route, based on a study of the intrinsic nature of mind alone. The pure realist reaches a negative conclusion by an equally short cut, by considering the properties of matter alone. Not a few thinkers entertain both doctrines at one and the same time, although they are mutually exclusive and contradictory. No wonder that they reach what Montgomery well terms "the puzzle of puzzles." But the rational conclusion from this deadlock must be, that there is something wrong with the methods of both sides. To the practical mind it seems that the vice in both methods is the failure to harmonise properly with their own, the facts adduced by the opposite side in the discussion. And it is indeed evident that that cannot be the final philosophy which restricts itself to a consideration of mind alone; or that which restricts itself to a consideration of matter alone. That men should pursue different lines of research is natural. Those whose minds are capable in the fields of conception naturally prefer idealistic studies; while those whose especial genius lies in the direction of mechanics, easily pursue materialistic research. What is needed is a combination of the two fields of ability in the same mind.

A considerable class of serious people, observing the diversities between the schools of philosophy, regard such studies as useless. Since they have not the disposition or ability to solve the question for themselves, they find it best to rest in uncertainty, which has optimistic or pessimistic tendencies according to temperament and education. The optimist has faith that all is, and all will be, well; while the pessimist takes the opposite view. Both are sustained in their position by those teachers who teach the impotence of our faculties and the uselessness of knowledge. Such appeal in support of their position to the facts already cited; the imperfection of our senses; the relativity of knowledge; the inscrutable nature of mind

and matter, etc. This position is, however, a plea of avoidance, and it will be time enough to listen to it when the avenues of the increase of human knowledge are permanently closed. This they are not at present.

The key to the position is the doctrine of evolution. Here we behold the interaction of subject and object, both in our own persons and in the inferior beings which are with us, and which have preceded us on earth. That mind has not sprung full-fledged upon this planet, is clear; and that it has made wonderful progress in power, is equally clear. Why did it not appear with all its powers "in the beginning"? The answer obviously is, "the intractability of matter." Why has it progressed in face of this obstacle? The answer is, the tractability of matter. Mind, through its intrinsic quality, has coërced matter, in ever increasing degree, and the limit of its capacity in this direction plainly has not yet been reached. Its most important conquest has been that of its own physical basis, and next to it is the conquest of the world of objects by which it is surrounded. Its last conquest will be the knowledge of its destiny, as a projection of its known past. To this end the knowledge of its own constitution is essential, but this is not all, as the pure idealist would have us believe. The knowledge of external relations is also essential, for we can in no state of being escape them. Psychic life is an "internal adjustment to external relations," quite as much as is the physical life, as it is defined by Spencer in the phrase just quoted.

The Deity of evolution indicated in the first section of this paper, will not satisfy the pure idealist. He is not an absolute, since He is compelled to respect relations. But we find Him to be just, which he evidently is not if absolute. He is anthropomorphic, and not an abstraction of the human mind. And yet as the seat of rationality, and as the director of free energy, He possesses the function of creator of whatever is possible. The evolution of independent human minds has been only possible through education, and here as elsewhere, teachable students have met with greater success than the stolid.

It has been already pointed out that the process of evolution

may be either progressive (Anagenesis) or retrogressive (Catagenesis). This is well known to be the case with organic types, where degenerate phyla are common. It seems, indeed, that in the order of things degeneracy has occurred wherever it has been possible; that is, under circumstances which permitted vegetative life through lack of stimuli to energetic motion. There has always been "room at the top"; but only when all the lower fields of existence have been for the time being filled, has there been room at the top only. The history of mental evolution has accompanied that of general structural evolution, and for similar reasons. It is well illustrated in human society to-day. These facts suggest that this has been the history of all evolution, since they harmonise with the order of evolution observed in our solar system, in which the inorganic has preceded the organic, or Catagenesis has preceded Anagenesis. If the forms of non-vital energy represent a result of Catagenesis, we are not bound to look on minerals as in any sense living, as has been suggested by Haeckel and others. Most, if not all, forms of chemical energy have sunk below the vital level, and certainly far below the possibility of displaying consciousness. We are here looking over unexplored territory, and one whose elucidation is entirely in the future, but we may put our ideas in order, if we do nothing more.

Besides his relations to the impersonal materials that surround him, man has essential relations to his fellow-man. The laws of these relations are ethics. Much is written and spoken against the utilitarian or evolutionary theory of ethics. I cannot, however, escape the conviction that this theory offers the true explanation of the rise of the ethical sentiment in mankind. But to understand it aright, we must include the growth of the social sentiment, as well as that of the rational element, in the evolution of justice or right. The opponents of this view sometimes commit the error common to all those who do not understand the nature of mental evolution. Some of them imagine that it is necessary to suppose that, in harmony with this theory, every man decides his every act solely in accordance with what appears to him at the time to subserve the lowest form of selfishness of which he is capable. The doctrine, on

the contrary, maintains that habits of honesty and justice are the result of the education of the ages, and that men obey such motives according to their developmental status ; that is, in accordance with the evolution of the habit of preferring the higher to the lower forms of utility. The further question of what it is that has raised the standard of utility, is answered by what we see going on around us. The fear of the law ; the love of the approbation of our fellows ; the sympathy with our fellow-men ; the fear of their indignation ; all these are educators of great potency, which have always been active. These motives, organised as character, are compulsory, and it would be strange if they have not been effective in producing results.

Practical ethics has to do with material beings and their material possessions, i. e. with person and property. Without the objective, the content of ethics is purely ideal, consisting of love and hate, and the justice and injustice of opinion which might be the outcome of those sentiments. These sentiments are realities of the subjective, representing the affections, as the form of thought constitutes the rational faculties. But if we endeavor in thought to deprive love and hate, justice and injustice, of all material consequences and implications, we deprive those sentiments of much of their value if we do not abolish their occasions altogether. It appears to me at least doubtful whether hate and injustice could exist in a society consisting of disembodied minds, if such beings could be imagined ; a supposition which I cannot entertain.

If ethics cannot exist without material expression, it is clear that, on the other hand, they cannot exist without a subjective foundation. Thus ethics is the highest expression of the relation between mind and matter. Ethics is the practical application of the mental powers to human relations, and the more complete the evolution of mind, the more perfect is the ethical practice. Thus the evolution of the mind is the guarantee of ethical progress, and the more intelligent the mind, the more easy will the evolution be. As in all education, the laggards experience the severities of compulsion, while pains and penalties are avoided by those who perceive their approach and do not await their arrival. Here we have the utilitarian ground of our numerous ethical and religious organisations.

They invite men to *a priori* subjective theory, and objective practice, so as to preserve society from the evils of inferior and painful methods of compulsion, which lie at the basis of ethical evolution. It is the dread of this method which rouses a natural repugnance in the minds of many men to the doctrine which teaches of it. But it must be remembered that the instruments of evolution change with the thing that is evolving, and the conditions of progressive ethics are the stages of progress of the mind. What is necessary for the education of the lower mind is no longer necessary for the higher. This is not only a truth of philosophy, but the fact may be discerned in the religions which men have made for themselves. They describe the ethical state of their authors, and prescribe the treatment appropriate to it.

Our knowledge of some parts of evolutionary history is meagre, and on some of its chapters we are absolutely in the dark. This is especially true of the causes of the appearance of life and consciousness on the earth. Spontaneous generation has not been proven, and the immediate source of sensation is unknown. The conclusions enumerated in the preceding pages are derived from evidence presented in more or less complete fragments. But the thesis remains true that mind possesses a limited control over its physical basis, but one which is sufficient to account for the main direction of the evolution of those organic forms which possess it. And it is also true that the essential forms of the rational mind are not due to corresponding qualities of the physical basis. These forms are: the principles of identity, of abstraction, and of generalisation or conception. These characteristics constitute the idealistic essence of Theism. But we look to the realistic element of Theism for the demonstration of the distinct personality of God.

E. D. Cope.

LITERARY CORRESPONDENCE.

GERMANY.

THE name of Cesare Lombroso is now more and more mentioned in Germany, not only in psychiatrical, juridical, and sociological works, written for the learned public, but also in the newspapers and magazines. By the side of occasional recognition of his doctrine of the born criminal and genius, we meet—and these are the majority of the cases—with violent attacks on it, which not seldom exhibit real ignorance of the views of the celebrated Italian investigator. Lombroso himself is partly to blame for this unfortunate circumstance, for his writings, with their mountains of undigested material, are so lacking in unity and perspicuity that misconceptions are very apt to arise.

The German translator of Lombroso, DR. H. KURELLA, psychiatrist in Kreuzburg, in Silesia, has recently given to the world a synoptical exposition of Lombroso's theory of the born criminal, under the title *Cesare Lombroso und die Naturgeschichte des Verbrechers*, Hamburg, 1892, Richter. The author not only expounds the doctrines of Lombroso, but also deals critically with them, and, although upon the whole his sympathies are with the views of the Italian scientist, he nevertheless believes that the existence of a fixed type of the *delinquente nato*, embracing all special forms of criminality, is yet a question of doubt. On the other hand, MAX NORDAU, a widely-read author of ours, gives unqualified recognition to the theories of Lombroso, fully accepting the idea of "degeneration," first introduced by Morel into science and further developed by Lombroso, and, in completion of the work of his master, extend-

ing this idea to art and literature. In his work, *Entartung*, the first volume of which was recently published by Carl Duncker, of Berlin, and is dedicated to Lombroso, "his dear, admired master," he says: "Degenerate types are not always criminals, prostitutes, anarchists, and idiots. They are often writers and artists, and these exhibit the same mental, and frequently also the same physical, traits as those members of the same anthropological family that satisfy their diseased instincts by means of the murderer's knife or the cartridge of the dynamitard, instead of with pen and pencil.

People who are acquainted with Nordau's previous works will perhaps imagine that this latest book of his is simply a mass of journalistic ebullitions which can lay no claim to *scientific* value. This, however, is wrong. Nordau is not only well acquainted with the patho-psychological literature of this province—especially with the French—but he also turns his knowledge to scientific account, which psychiatrists like Pelman and others have publicly admitted. Taking it as a whole, Nordau has presented in this first volume of his work a good psychology of mysticism—good, that is, for all who accept the association psychology. Nordau's expositions embrace all the psychological theories which belong in this province, with their applications to individuals and to the tendencies of modern literature and art. With respect to the first point, the author is right in saying that he does not offer here anything new to the professional psychologist, but he is wrong in his theory that psychologists will read this chapter with impatience, for his exposition is unquestionably elegantly written. Of much greater interest is the second part, in which a diagnosis of imbecility is rendered upon the English pre-Raphaelites, the French symbolists, the Tolstois, and Richard Wagners. The chapter on Richard Wagner will especially attract attention for its severity. Nordau closes it with the words, "of all the aberrations of the present time, Wagnerism is the most widely diffused and the most important. The playhouse at Bayreuth, the *Bayreuther Blätter*, the Parisian *Revue Wagnerienne*, are lasting monuments by which the future will measure in wonderment the dimensions of this degeneration and hysteria of our day."

Nordau throws light upon numerous mooted phenomena of

modern art and literature, pointing out their diseased features. One is really surprised at the extent of his work. All in all, it may be foreseen that Koch's doctrine of the "psychopathical minor factors"—or those psychical factors which constitute the border-line between mental health and disease—will clear up much more extensive fields than they have, when applied in the direction indicated by Nordau. KOCH has now published the third part of his work, (which I have repeatedly mentioned in *The Monist*,) and thus completed it. He concludes his last volume with these words: "The domain of the 'psychopathical minor factors' is a wide and very interesting one. Whosoever enters profoundly into it will learn to look at much in life with different eyes from those with which he began, will understand many men and many human acts, which before he did not understand. There are yet many scientific treasures to be unearthed in this field, and I hope that I shall win many a coadjutor. I hope, also, that qualified men will make this theory of the psychopathical minor factors fruitful in wider fields and for greater problems."

It is a common belief that it is pre-eminently in our time that psychical disorders and psychical minor factors play so great a rôle. But that in the sense of Nordau they are not of so recent origin a careful reader will learn from a new work of LUDWIG GEIGER, the well-known historian of literature and civilisation (Paetel, Berlin). Its title is: *Berlin, 1688–1840: Geschichte des geistigen Lebens der preussischen Hauptstadt.* As yet, only the first volume has appeared, which extends to the death of Frederick the Great. The reader, however, would obtain an entirely wrong impression of the work if he were to believe that psychiatrical points of view are expressly dwelt upon in this book. To find them he must read between the lines. The book is an extraordinarily painstaking history of the civilisation of Berlin, taken from the sources, and giving especial prominence to intellectual factors. We shall reserve the detailed discussion of this important work for another occasion, perhaps until it is fully completed.

CHRISTIAN UFER.

BOOK REVIEWS.

HAND-COMMENTAR ZUM NEUEN TESTAMENT. IV. EVANGELIUM, BRIEFE UND OFFENBARUNG DES JOHANNES. Bearbeitet von *H. J. Holtzmann*. Zweite verbesserte und vermehrte Auflage. (Freiburg I. B. and Leipsic: 1893. J. C. B. Mohr.)

The fourth gospel, of all the sacred writings of the New Testament, has always been the reviewer's favorite book. Its profundity, its wealth of philosophical ideas, the fervor of its author's religious sentiment, and the spiritual grace that pervades the whole book, exercised an unspeakable charm on my mind. This gospel was the first to rouse my doubts in the belief of literal inspiration, and it was again the one, which, after the severest storms of infidelity had blown over, reconciled me to the spirit of Christianity. Thus the perusal of Professor Holtzmann's commentary again arouses the recollections of former struggles, and I find that even to-day the first chapter of the fourth gospel has lost none of its fascination. It is a wonderful book, and its author is a man whom I always longed to meet and shake hands with, over a span of almost two millenniums and a world-wide abyss of difference of opinion.

Only those who are familiar with the difficulties of the St. John literature of the New Testament can really appreciate this latest work of Prof. H. J. Holtzmann. He presents in a most clear and concise manner the problems involved, together with their various solutions, critically arranged. He carefully avoids obtruding on the reader his own views. He stands before us as a faithful compiler only. I say "only," but this "only" means a great deal. It does not mean that he suppresses or conceals his own views, it means that he states the facts with scrupulous impartiality. If there is any partiality apparent in his treatment of the sacred writings, it is the reverent attitude he preserves whenever love of truth obliges him to accept the negative result of critical investigations. And where is there a theological scholar to-day, who is orthodox enough to dare to accept the theory that the gospel of St. John was written by the apostle? Holtzmann carries his impartiality to the extent of not rejecting this old traditional idea, concerning the authorship of the fourth gospel, but the evidence against it is overwhelmingly sufficient to satisfy the most narrowminded believer. Holtzmann teaches us at the same time to under-

stand the spirit of the first and second century of our era, and thus excludes from the beginning the old prejudice, that if the author were not the man whom he impersonated his work must be regarded as a fraud. The historical value of the book lies in the revelations it gives us concerning the religious demands of the times in which it was written. The fourth gospel originated when the Jewish religiosity of growing Christianity began to expand into cosmic universality. The author was undoubtedly a Jew-Christian, whose home most likely was Ephesus. Ephesus was the place where we find the first beginnings of Christian Alexandrianism. Here the Logos-idea was introduced into Christian thought. Philo, the Alexandrian Jew, had already represented Moses as the incarnation of the divine Logos. Should not now a Christian familiar with Philo's philosophy apply the same method to Jesus of Nazareth? Some work adapted to satisfy the wants of the time and especially the religious yearnings for knowledge as a means of edification was needed. The Christ-idea had taken a definite shape in the imagination of the Christian congregations of Asia Minor, consisting of diaspora Jews and Gentiles, and their Christ-idea found a worthy expression in the picture of Jesus of Nazareth as we have it in the fourth gospel.

The fact that the author of the fourth gospel was a Jew-Christian, appears from his readiness to explain Jewish customs. He knows Judaism, and is familiar with Jerusalem as it appeared after the destruction of the temple. The probability is that he wrote his gospel between 120 and 140. He is comparable to Matthew in so far as both are greatly interested in the controversy between Gentiles *versus* Jews, yet Matthew's Israel has grown into the world-wide cosmos. The frequent occurrence of the very word "cosmos" in the fourth gospel is remarkable. In the same way the Greek term γεγνώσκειν (to know) appears besides the older term πιστεύειν (to believe), which latter is a translation of a Jewish conception, still employed so vigorously by St. Paul. The author of the fourth gospel is not familiar with Galilee and does not seem to care for consistency in the details of his accounts, for he frequently contradicts his own statements. The most important differences between his and the three synoptic gospels are the accounts as to the main field of Jesus's activity, which according to St. John was Judea, according to the synoptic gospels Galilee, and the day of Jesus's death, which according to St. John is the 14th of Nisan, according to the synoptic gospels the 15th of Nisan, so that if we follow the latter, Jesus would have been tried and condemned, against all Jewish customs, on one of the greatest festival days. Holtzmann rightly warns the reader, that whatever may speak in favor of the synoptic gospels as being, in general, historically more correct, the author of the fourth gospel might have had some special source for this particular fact.—

The Revelation of St. John has given more trouble to the Christian exegesis than any other book, and light was not shed upon its plan and construction, until it was found to be one instance only of a whole class of literary productions. When we consider the Revelation of St. John in the same line with other apocalyptic

works, and when we understand the mental disposition of the pious Jews shortly before and after Christ, we have a clew to the enigmatic visions which are unrolled before our eyes.

The expectations of the Jews in the times of the Maccabees were disappointed again and again. The great events of the world did not justify the national hopes, and God did not seem to care about fulfilling his promises. The last prophet, who called himself Malachi, or "the messenger of God," proclaimed the message of the Lord, "Yet I loved Jacob," and he comforts the faithful who still endure in all their tribulations, that "a book of remembrance is written before him for them "that feared the Lord and that thought upon His name." After Malachi, a number of revelations appeared, which, to the satisfaction of the Messianic expectations, explained the events of the world, and prophesied that those only who should persevere until the end would be called upon to rule, together with the "Son of Man," who is to come to smite the heathens and to rule them with an iron rod. The first apocalyptic author, who wrote in 164 B. C., impersonated Daniel, the prophet, who had lived about 400 B. C. The powerful nations of the world are represented as beasts, the fourth and last beast being the Macedonian empire. It has ten horns, that is, rulers, the last one being Antiochus Epiphanes. As soon as his power is broken, the power over the earth will be given to Israel, which is called the Son of Man. The power of the tenth horn was broken, indeed, yet the Messianic hopes remained unfulfilled, and thus new prophecies were wanted, which should again explain the plans of the Almighty, so that the faithful would still endure and hope. Thus, Henoch was written, and after Henoch the Assumption of Moses, the book of Baruch, and other revelations.

The apocalyptic literature is characterised by Messianic expectations and eschatological reflections. The end of the present course of affairs is said to be near at hand and a new order will be established in which the faithful shall rule for a whole millennium and the wicked be tormented.

The Revelation of St. John represents this spirit of apocalyptic hopes among the early Christians of Asia Minor. It throws much light upon the conditions and the conceptions of a period concerning which we have very little information. We here see Christianity in its beginnings. The coloring of the Revelation is still Jewish. Its author stands in a conscious contrast to the Greek spirit which is about to change the properly Jewish character of the new doctrine. The author of the St. John revelation is a Jew to the backbone still; he denounces the antinomistic Christianity of the Gentiles as represented by Nocolaitanes whom, we are told, God hateth. He does not directly mention the apostle St. Paul, but there is little doubt that he is alluded to in Chap. II, 2, as one of them "which say they are apostles and are not."

The more powerful the Greek spirit grew in the church, the weaker became these original features inherited from the diaspora Jews until they were dropped forever through the efforts of Origenes who made a decided and successful opposition to the belief in the millennium. Yet it took some time for the traditional view of

the Messiah to change into the purer and more spiritual Christ-idea. There were two parties in the early church who spoke two radically different idioms; the one still cherished the old chiliasm, dreaming of the establishment of a millennium on earth. Their terminology moved always in the same allegories: they spoke of green and fat fields and of sulphurous abysses, of white horses and terrible beasts, of trees of life, of golden cities and of war and bloodshed, while the other party spoke of Logos, of the eternal Son through whom the world had been made, of "the dispensation of the fulness of the times in which God might gather together in one all things in Christ, both which are in heaven and which are on earth," of the pleroma and of aeons.

The Revelation of St. John is an expression of the former party and it was natural that after a complete victory of the latter party, Christian teachers knew not what to make of this book which shows Christian views by the side of an irreconcilable Judaism, and a worldly empire in Jerusalem, the beloved city with twenty-four Jewish elders representing the twelve tribes of Israel. The rest of Jerusalem is to be finally converted while there is no hope for paganism. The difference between Israelites and Gentiles remains a radical one even in the Holy City when the new heaven and the new earth has been created. The Gentile-Christians appear as citizens of a lower order. The Israelites alone live in the city while the Gentiles only walk in the light thereof, and they shall bring the glory and honor of the nations into it.

We have given a few glimpses of the problems of the St. John literature only. It is impossible to go over the whole field. Nor is it necessary to do so. Professor Holtzmann has given us so complete a presentation that we need but refer to his work which is indispensable to all interested in the literature of the New Testament. It will be the more valuable and welcome as it is furnished with an index, a feature rarely found in German books. P. C.

Die Willensfreiheit und ihre Gegner. By *Dr. Constantin Gutberlet*. Fulda: Fuldaer Actiendruckerei. 1893.

Dr. Constantin Gutbertlet regards the doctrine of freewill as a cardinal doctrine of Christianity. In the present booklet he endeavors to show that all attacks made upon it by unchristian savants have failed. He criticises Höffding, Lombroso, Wundt, Münsterberg, Lotze, P. Ree, and Schopenhauer, and establishes as his own view a theory of freewill which he calls "freedom of choice." He says: "There is no decision without *sufficient* reason, but there may be without *rational* reason. The sufficient reason is that a greater good may be recognised as possessing 'blind' sides; that we can do without it and even reject it for the sake of these 'blind' sides. On the other hand, a lesser good may be given as an object of willing, and our willing by its own energy conditions the free decision of the will" (p. 25). Freedom of will is not a reversal of causation, which latter, according to Gutberlet, is "an absolutely necessary law" (p. 8 and *passim*).

It is difficult to understand how Gutberlet, taking this view, can class himself among the indeterminists. From his premises, we should expect him to take the view which we have defended, that freedom of will is not contradictory to determinism. If freedom of will means freedom of choice, in which "we ourselves, as the contents of our ideas, feelings, and dispositions, are the cause not only of our activities, but also of our free decision" (p. 19), then our decisions are most certainly determined by our character. Gutberlet's criticism of Wundt (pp. 167–171), who defends freedom of will and determinism, is wide of the mark, and it seems that Gutberlet is either not clear on this point himself or he does not draw the consequences of his own standpoint. Says Gutberlet: "Only on the supposition that there is "no other than 'mechanical' causation of natural forces, can the determinist main- "tain that freedom abolishes the principle of causation. In the application of the "principle of causation 'what happens has a cause' to natural forces, the principle "can be inverted thus: 'when all sufficient causes are given, the effect follows with "necessity.' Yet if there are spiritual agents which stand above the mechanical "causation of nature and natural forces, we cannot *a priori* declare that their effects "follow with the same necessity from their character as is the case with nature. "Accordingly, unless we assume the questionable theory that free causation is im- "possible, we cannot invert here the principle of causation and use it against free "decision" (p. 168).

How does this sentence agree with Mr. Gutberlet's statements that causation is an absolutely necessary law and that "we ourselves . . . . are the cause of our free decision." Our decisions are determined by "our ideas, feelings, and dispositions," and yet a sufficient cause determines its effect only if the causation is mechanical, not if it is spiritual. Gutberlet explains the difficulty as follows: "Certainly, if we "did not reduce the free decision *once made* (die *eingetretene* freie Entscheidung), to "an adequate cause, we should sin against logic and psychology. But we under- "stand by 'adequate cause of a decision' not only the influence of motives, but "also the energy of a free will." Very well then, Mr. Gutberlet would be a determinist as much as Wundt. Decisions are determined by two factors: (1) by the motives (i. e. the objects which act as stimuli upon the will) and (2) by the character of the agent. Not everybody is affected by the same stimulus in the same way. One chooses this and another that motive, and his character determines the choice; and a man of a certain character, under definitely given conditions, will freely and yet necessarily choose a certain motive. Dr. Gutberlet, it appears to us, says yes and no in one breath.

Dr. Gutberlet is the editor of the *Philosophisches Jahrbuch*, a Roman Catholic periodical. He belongs to that class of men who by partisans of free thought are regarded as especially dangerous. He is not as narrow as the common type of *defensores fidei*. He studies the works of modern savants "whose intellectual superiority," as he confesses, he "admires in many respects." He is broader than most of his *confreres*, and thus he makes the creed of his church appear broader than it practically is.

We can see no danger in the appearance of such men. It is true, he will make converts among the educated, or at least, he will keep some wavering elements within the pale of the church; for the Roman church is, upon the whole, still very hostile to progress. But, on the other hand, such a man is in his circles a missionary of science; he will help to broaden the views of his brethren. He is learning, and they will learn from him. P. C.

GRUNDZÜGE DER PHYSIOLOGISCHEN PSYCHOLOGIE. By *Wilhelm Wundt*. Leipsic: Wilhelm Engelmann. 1893.

Wundt's "Physiological Psychology" is perhaps justly regarded as his best and most valuable work. We have just received the first part of the fourth edition and may expect that the second part will soon appear. We intend to review the whole work as soon as completed, and will state here only that this new edition contains, among many emendations and additions, an explicit account of the modern methods of psychological investigations, with descriptions and illustrations of the most important instruments invented for that purpose. κρς.

VERGLEICHEND-ENTWICKELUNGSGESCHICHTLICHE UND ANATOMISCHE STUDIEN IM BEREICHE DER HIRNANATOMIE. 3. RIECHAPPARAT UND AMMONSHORN. Abdruck aus *Anatomischer Anzeiger*. By *Dr. L. Edinger*. (Jena: 1893. Gustav Fischer.)

Dr. Edinger proves in this essay that in the cerebral evolution of animals the cortex makes its first appearance in the formation of the cornu ammonis. This convolution being the centre of smell, it is more than merely probable that smell sensations, or something analogous to smell sensations, were phylogenetically the first psychical functions. κρς.

ÉTAT MENTAL DES HYSTÉRIQUES LES STIGMATES MENTAUX. By *Pierre Janet*. Paris: Rueff & Co. 1892.

M. Pierre Janet, one of the most prominent disciples of Professor Charcot, presents in this little volume of two hundred and thirty-three pages a summary of the results of modern psychical research as it is understood at the Salpétrière. Charcot himself recommends the book to the medical profession. Janet investigates anæsthesia (Chap. I), amnesia, abulia, the diseases of motion, and the modifications of character. The author proposes to "describe the phenomena and endeav-"ors to establish a rigorous determinism of their relations. The moral view of a "diseased person," he says, "ought to constitute a part of the clinical diagnosis "while the psychical state must be closely investigated in its connection with phys-"iological facts. This is the only way in which the physician can gain a knowledge "of the entire man and understand the diseases which affect his organism."

Professor Charcot states that Professor Janet's researches on the mental state of hysterical persons were begun long ago and completed under his supervision; that they were expounded by M. Janet in the Spring of 1892 in a few lectures at the

Salpétrière ; that they tend to confirm the idea, often expressed in his own teachings, that hysteria is upon the whole a mental disease.

Hypnotism has long enough been regarded not only as harmless but even as a panacea for almost all the ailments of mankind. It would be well to heed Charcot's warning, as hysterical diseases may be treated with better success, if the mystery that still surrounds them disappears before calm and scientific investigation. ς.

L'ÉCOLE D'ANTHROPOLOGIE CRIMINELLE. By *l'Abbé Maurice de Baets*. Gand: P. van Fleteren. 1893.

Dr. de Baets, Professor of Philosophy of the Gregorian University of Rome, Italy, and Secretary to the Bishop of Ghent, criticises in this elegantly printed little volume the modern school of criminal anthropology. He believes with Herbert Spencer that, if a great number of people accept certain errors, these errors must contain a kernel of truth. Professor de Baets says that he does not deny crime to be an outgrowth of the organism, to be inherited, to be closely connected with insanity, etc., but he cannot approve of criminal unaccountableness. The denial of responsibility, he says, is the denial of the wrong, and the denial of the wrong is the denial of morality. He sums up his view in italics on page 48: "Man is responsible for his acts in the measure that his acts depend on a free will." κρς.

AGAINST DOGMA AND FREE-WILL. By *H. Croft Hiller*. London: Williams and NORGATE. 1892.

The author has much to say against ecclesiasticism and sacerdotalism, and while he repudiates such men as Wundt and Ribot, he "begs to thank Drs. Weismann, Luys, and Ferrier from whose labors the views expressed in this treatise derive that scientific authentication without which they would be worthless." The book is apparently a first venture into the stormy ocean of literary pursuits. ς.

THE PHILOSOPHY OF INDIVIDUALITY, OR THE ONE AND THE MANY. By *Antoinette Brown Blackwell*. New York and London: G. P. Putnam's Sons. 1893

The author trusts that she has "*demonstrated* a conscious immortality. In a former book of hers entitled "The Physical Basis of Immortality," 1876, she propounded "the theory of persistent mind-matter individuals" which are to be conceived as ultimate atoms. The present volume of five hundred and nineteen pages is written to show that "this conception of the ultimate atoms could consistently explain and harmonise mental and material phenomena and by coördinated interpretations of the most diverse processes simplify and unify nature and her manifestations." The theory of the correlation of matter and mind is accepted; "Nature," the author says, "is nothing if not mathematical," and there are many passages to which no monistic thinker would take exception. Along with them we find statements, e. g. on the rhythmic motion of atoms, etc., which it will be difficult to prove. Her peculiar view is characterised in the following sentence: "All ultimate "individualities *may* be identical in kind, but no obvious necessity decides that they

"*must* be, and in an order of things where other varieties are prevalent, the weight "of evidence for the present is on the side of varieties, even in the ultimate units." The author's theory (if we rightly understand her) has been tried before. Some suggestions of Goethe's seem to indicate that he believed in soul-monads, and the German psychologist Herbart erected on the assumption of material soul-atoms his system of a mathematical psychology in which sound science was curiously mingled with improbable vagaries. The author of "The Philosophy of Individuality," although apparently quite well informed otherwise, has, strange enough, not taken notice either of Goethe or of Herbart. Perhaps she would have abandoned her theory if she had been fully familiar with Herbartism and the critique which it has received; for Herbart's soul-atoms are to-day regarded as a thing of the past. *κρς.*

DIE GRUNDBEGRIFFE DER GEGENWART. By *Prof. Rudolf Eucken.* Leipsic: Veit & Co. 1893.

Prof. Rudolf Eucken discusses in this volume such topics as "Subjective—Objective"; "A priori—A posteriori"; "Monism—Dualism"; "Idealism, Realism, and Naturalism"; "Theoretical—Practical," and so forth. It seems to us that Eucken has not yet fully succeeded in reconciling his philosophy with natural science. We are glad to notice that he has a critical eye for the shortcomings of naturalists under whose methods of classification and mechanical conceptions the properly spiritual of man would be eliminated. He is judicious in his exposition of the various problems, but we miss a final solution, such as would clearly state and recognise the truth in both. Nevertheless the book is sound, full of valuable information, and its perusal is to be recommended to every student of philosophy.

κρς.

THE ÆSTHETIC ELEMENT IN MORALITY. By *Frank Chapman Sharp, Ph. D.* New York: Macmillan & Co. 1893.

The book contains chapters on: (1) the theory of altruism; (2) the intrinsic worth of character; (3) an analysis of moral beauty; (4) an examination of the æsthetic method of ethics; and (5) the idea of obligation in æsthetics and ethics. The author's knowledge of ethical theories appears to be limited. Duns Scotus, the Realist, is called a thoroughgoing Nominalist. In spite of such defects, we find much that is good in the book. In the end of his discussion the author says with truth: "When the element of the *good*, or that which is capable of clothing itself "in the form of an ideal, is taken out of the conception of obligation, this latter "degenerates into what is nothing more than mere submission to an arbitrary im-"perative. . . . Prometheus, chained to the rocks for bringing the gift of fire to the "wretched barbarous inhabitants of the earth, in defiance of the will of the 'Father "of gods and men,' is one of the grandest productions of the human imagination, "and were the Supreme Being such a one as Augustine and Calvin imagined him, "we should despise the wretched slaves that licked the dust at his feet." *κρς.*

PERIODICALS.

ZEITSCHRIFT FÜR PSYCHOLOGIE UND PHYSIOLOGIE DER SINNESORGANE.

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DIE STABILITÄT DER RAUMWERTE AUF DER NETZHAUT. By *Franz Hillebrand.*
UEBER EIN OPTISCHES PARADOXON. (Second Article.) By *Franz Brentano.*
LITTERATURBERICHT. (Hamburg and Leipsic: Leopold Voss.)

This second article, "On an Optical Paradox," is a rejoinder of Franz Brentano of Vienna to Th. Lipps. We gave an account of this interesting discussion in *The Monist*, Vol. III, No. 1, p. 153 et seqq. Professor Brentano insists on explaining

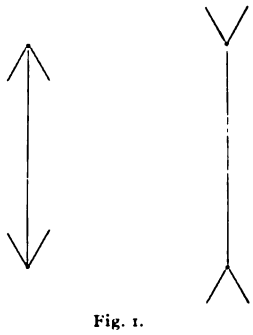

Fig. 1.

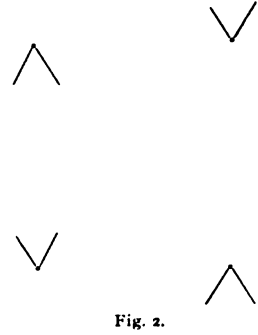

Fig. 2.

the optical illusion concerning distances between two points, as seen in Fig. 1–3, by an overestimation of small and an underestimation of large angles. He complains of being misunderstood by Professor Lipps who substitutes "acute" for "small" and "obtuse" for "large"; for, says he, in comparisons both angles may be obtuse or both may be acute. Professor Brentano adds some more puzzling figures to prove his case; and, as in his first article, his propositions are ingenious and thought-stimulating; but his arguments do not suffice to convince us of the validity of his theory. We do not exactly intend to deny the general rule as to the overestimation of large and underestimation of small angles, but are inclined to believe that it will not serve as a sufficient explanation. We reproduce the most important figures devised by Brentano, and take the liberty of adding a few remarks and additional figures of our own.

Fig. 4 represents two right angles, one of which is divided into nine angles of 10° each. Brentano claims that we so overestimate the nine small angles as to take

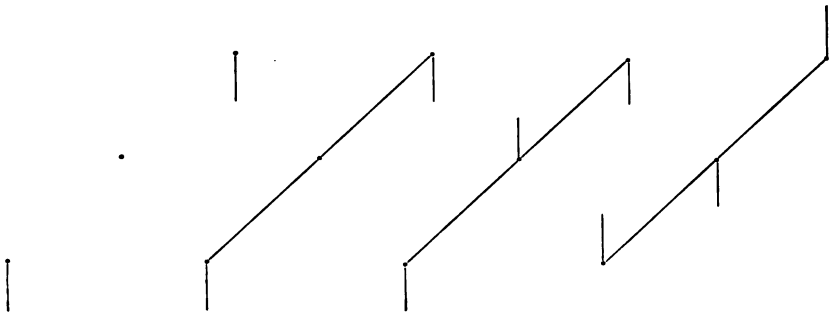

Fig. 3.

the undivided right angle as an acute one. I can only say that however much I have tried, I am not subject to the illusion.

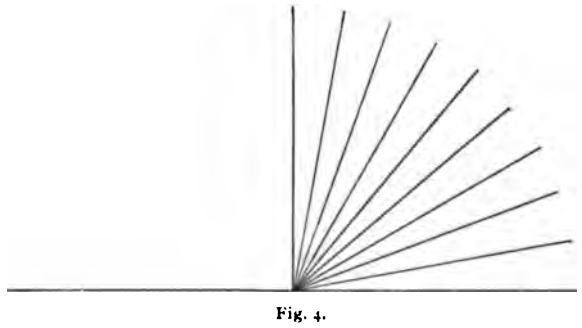

Fig. 4.

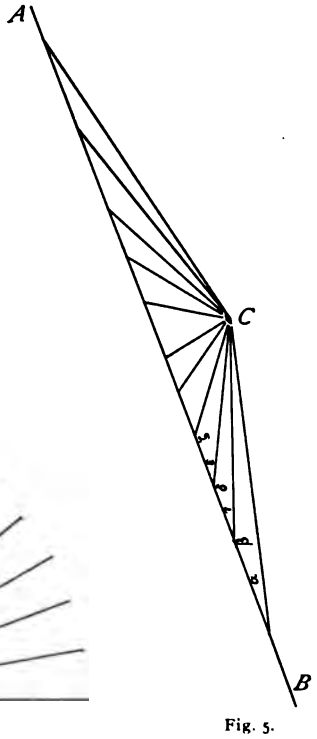

Fig. 5.

In Fig. 5 we have on the straight line AB a series of stations which are connected with a common centre. The line AB is not a curve, but this figure reminds us of a perspective view of the sector of a circle. The drawing appears as the

diagrammatic picture of a shield, the buckle of which is in *C*. Thus *AB* is conceived as representing a curve. It does not seem that a comparison of the angles has anything to do with the illusion.

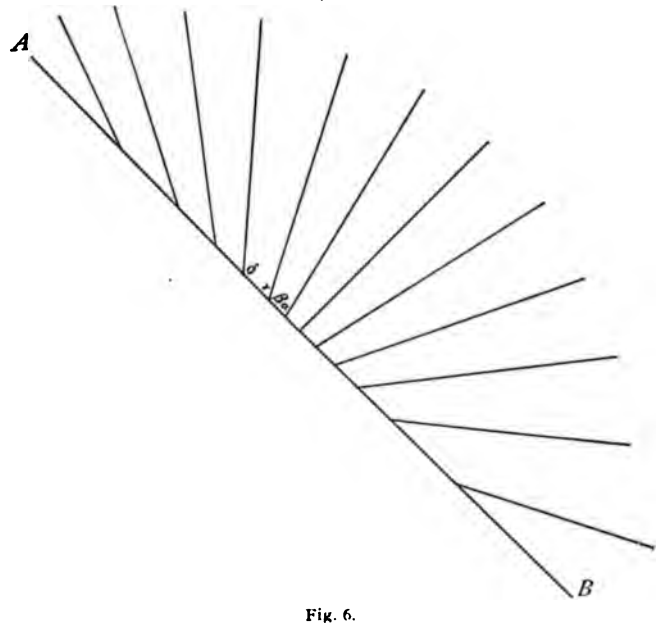

Fig. 6.

How much perspective interferes with the optical illusions under discussion, impresses itself upon my mind, when I think of figure 5 as the diagram of a mountain, rising above the plane *AB*. If I imagine I stand below the plane, which may be a high table-land, the line *AB* appears to my eye straight. But when I imagine

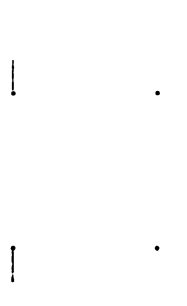

Fig. 7.

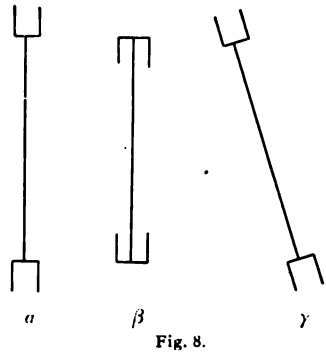

Fig. 8.

I am looking down upon the plane, the curvature of *AB* becomes very strongly marked.

In Fig. 6 we can detect no optical illusion. The line *AB* appears straight to us. The drawing reminds us of a sunrise on the ocean.

The same must be said about Figure 7. Brentano, in agreement with Lipps, claims that we are inclined to regard the distance between the ends of the two lines

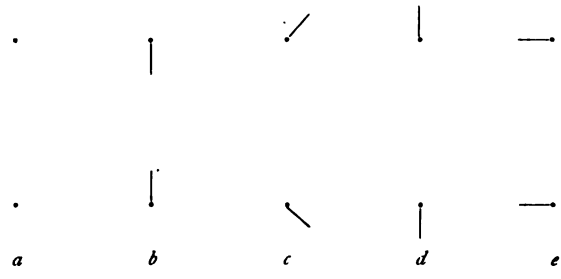

Fig. 9.

as larger than between the points. If there is any illusion at all, it seems to me, that on the contrary, the distance between the ends of the lines appears shorter. And why? We measure the distance by allowing our eyes to run from one point to the other and then comparing the measurements. This comparison is geometrically effected by combining the respective starting points, and thus judging as to the parallelism of these two lines mentally constructed. Whether or not the dots appear equidistant, depends upon the execution of all these operations. While directly measuring the distances between the points, we have an easier measurement where the lines are attached. The lines give to the points a certain vim; they almost appear to move with a velocity indicated by the length of the little lines, while the isolated dots present a very phlegmatic appearance.

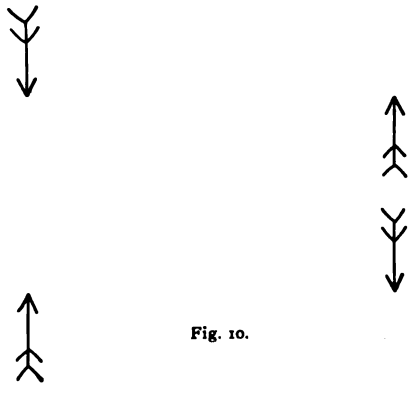

Fig. 10.

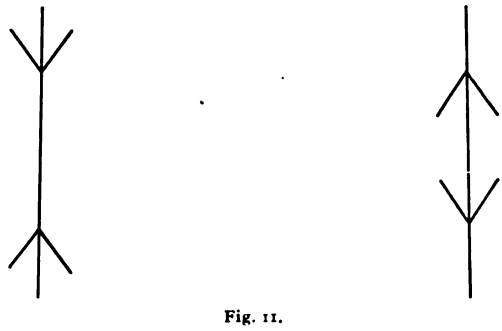

Fig. 11.

In order to see what effects other positions of the lines produce, let us compare in Fig. 9 the several relations by covering the rest. If there is any illusion as to *a* and *b*, we should say that the points of *a* appear at a greater distance; as to *b* and *c*, we see the greater distance in *c*, as to *c* and *d*, we feel doubtful, while any comparison with *e*, tends strongly to convince us of their equal distance. The reason is obvious. The lines in *e* assist us in drawing the parallels, which we consciously or unconsciously construct in order to compare the distances.

A comparison like that of α and β in Fig. 8, where the equal length of the combining lines is very apparent, induced Brentano to regard the illusion which is observed in Figures 1–3 as due to the angles. In our opinion he is mistaken. For the illusion actually takes place in α and β; only it is quickly corrected with the help of the parallels, which, as in ϵ, assist the imagination in making an exact comparison. When we place α and β either at a sufficient distance, or are somehow prevented from making use of the parallel lines, we shall have the same illusion as appears in Figures 1, 2, 3. To prove this, we have but to bring the figure α in a slanting position, as is shown in γ, and the illusion is so strong that many will find it difficult to believe that γ is an electrotyped duplicate of α.

The mooted illusions are not sense-illusions, but illusions of judgment; and we believe that the explanation of these curious phenomena must be sought in the elements which unconsciously enter into the make-up of our judgments.

Lipps says that lines are felt to be movements. If a line is continued, albeit with a slight declination, the motion appears "free and victorious," aspiring be-

Fig. 12.

Fig. 13.

Fig. 14.

yond itself; while, if confined in the corner of an acute angle, it seems cut off and impeded. The victoriously progressive motion is overestimated; the checked motion is underestimated.

Brentano, in order to meet Lipps's objections, proposes a few additional figures, of which we reproduce the most important ones in Fig. 10–14.

It seems to us that the main part which the angles play in these or any other similar figures, consists in leading our imagination astray. The parallel lines which we attempt to construct for our comparison, switch slightly off with an inclination toward the angles.

But that is not all; there are other elements that affect our judgment at the very outset. In measuring a distance we do something, and in looking at a diagram we think something. The diagram is suggestive of some reality to which we compare it. All these ideas, be they conscious, sub-conscious, or even unconscious, affect our judgment and are sometimes apt to lead it astray.

In addition we have to mention two things, the influence of which upon our verdict cannot be doubted; the one is the size of the entire figure, the other the vacuity of the distance to be measured: both tend to make the distance appear

longer than it really is. To illustrate this, we add the three Figures 15, 16, 17 which contain no angles and yet show the same illusions.

The distance between the points in Figure 17 appears longer than in Figure 16, and in Figure 16 again longer than in Figure 15. The fact is, that before starting on our measurement-journey, we have in Figure 17 already traversed a good distance after having noted the extraordinarily lengthened boundary marks. The town *A* may be exactly as far as the town *B*, yet the journey to *A* will appear longer, if I have to ride an hour before I reach the station, while I may live opposite the terminus of the railroad to *B*.

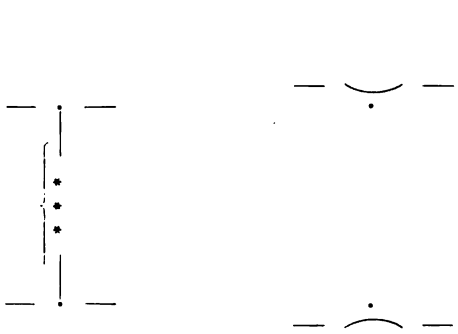

Fig. 15

Fig. 16

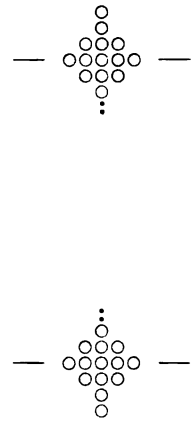

Fig. 17.

When our eyes glide down from one point to the other, we pass in one case through an empty desert the dreariness of which is not interrupted. We almost lose our way and become lonesome in its monotony. If our way, however, is full of variations, we are pleasantly entertained and regard our journey as so much shorter. The contrast is most obvious in figure 10. The time-illusions as to the swiftness of hours of work or amusement and the slowness of moments of *ennui* have become proverbial among all nations. The more dreariness, the more marked is the lengthening of the distance, while even a partial accompaniment shortens the traversed road. κρς.

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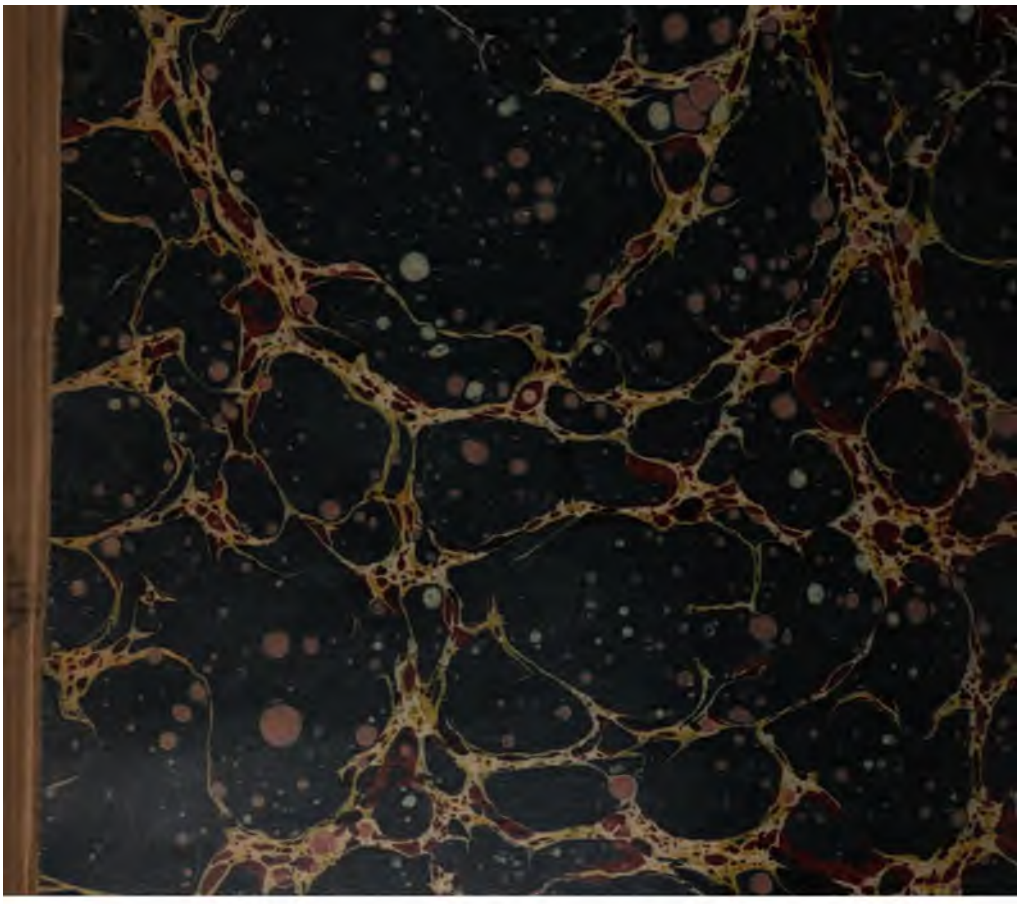

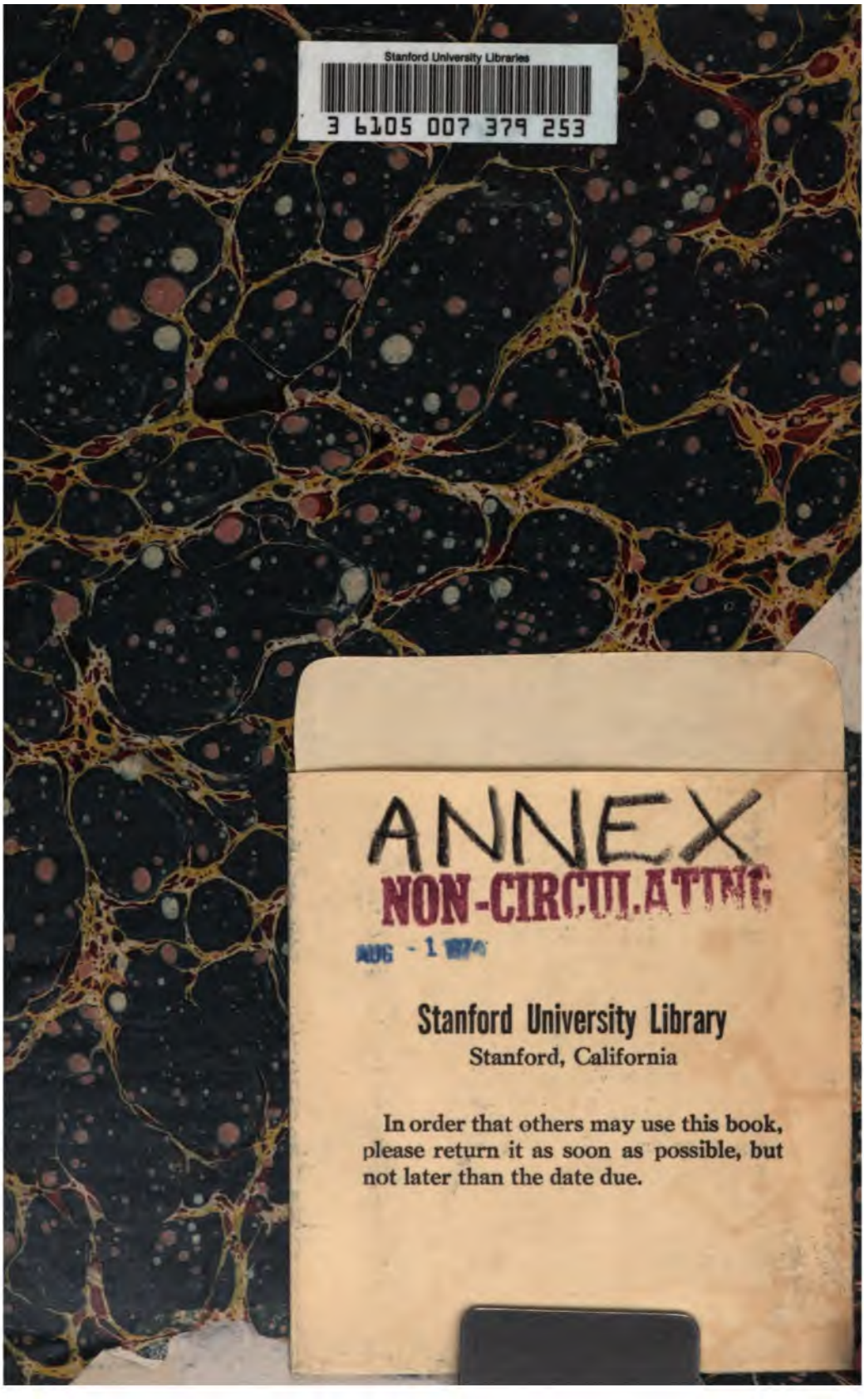
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